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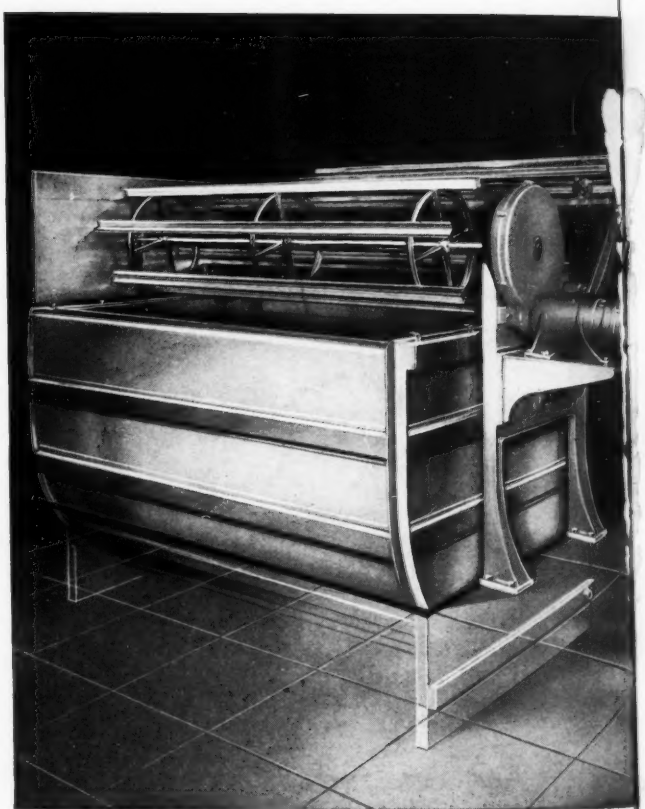

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AMERICAN
DYESTUFF REPORTER

VOLUME 26 AUGUST 23, 1937 NUMBER 17

Mildewproofing Khaki

And Other Mineral Dyed Cotton Duck with Copper Compounds

T. D. JARRELL, L. S. STUART and H. P. HOLMAN*

INTRODUCTION

PRACTICAL treatments which will prevent or materially retard deterioration by micro-organisms, and thereby increase the usefulness of cotton fabrics for purposes involving continued exposure to the weather, are of the utmost importance to all users of such textiles.

It is generally known that cotton fabric treated by the cuprammonium process is resistant to mildew growth because of its high copper content. However, work conducted in the Department of Agriculture some years ago indicated that fabrics treated by this process gradually lose copper by the action of atmospheric agencies upon exposure to the weather.

The production of mineral dyed khaki fabrics is based upon the precipitation on the fabric of mixtures of hydrated iron and chromium oxides. Small amounts of other metal compounds are sometimes used in conjunction with the iron and chromium compounds. Manganese is sometimes used to deepen the color and according to Hayes[1], a copper compound is sometimes used to produce a bluer cast. It occurred to the authors that addition of copper compounds in mineral dyeing might also be an advantage in imparting mildew resistance to mineral dyed fabrics.

The experiments reported here were undertaken primarily for the purpose of determining if copper precipitated on cotton duck in a water-insoluble form is an essential ingredient of mineral khaki dye in order to impart mildew resistance to dyed fabric for outdoor use, and, if so, the minimum amount that must be added in order that the fabric will still retain its mildew resistance after weathering for a reasonable time.

EXPERIMENTAL PROCEDURE

The stock solutions of chemicals used for treating or for making up the treating mixtures were as follows:

Chromium-potassium sulfate (*chrome alum*), $Cr_2(SO_4)_3 \cdot K_2SO_4 + 24H_2O$. 2195 grams dissolved in 5,000 cc. of water. This solution had a specific gravity of 1.146.

Chromic acetate, $Cr(C_2H_3O_2)_3 + H_2O$. 2335 grams dissolved in 5,000 cc. of water. The specific gravity of this solution was 1.162.

Ferric sulfate, $Fe_2(SO_4)_3$. 5,000 grams added to 5,000 cc. of water. Upon adding this salt to water, a water-insoluble material was formed. After settling, the clear ferric sulfate solution having a specific gravity of 1.450 was decanted off.

Pyrolignite of iron (*black iron liquor*). This material was prepared commercially and had a specific gravity of 1.070.

Cupric acetate, $Cu(C_2H_3O_2)_2 + H_2O$. 350 grams dissolved in 5,000 cc. of water. This solution was nearly saturated (about 7 per cent) at room temperature and had a specific gravity of 1.035. Cupric acetate solution of this strength was used for impregnating some samples (Nos. 10-1, 10-2, 10-3 and 10-4 listed in Table 3). Weaker solutions, made by diluting the stock solution with water, were used for others.

Sodium carbonate, Na_2CO_3. 250 grams anhydrous sodium carbonate dissolved in 5,000 cc. of water. This solution was used as an after-treatment for precipitating insoluble compounds of chromium, iron, and copper on the fabric.

All of the chemicals used, excepting the pyrolignite of iron, were of C. P. grade. Distilled water was used in dissolving them.

Eight-ounce (28.5 in. x 36 in.) gray, unsized United States standard army duck†, cut from the same bolt of 50 linear yards into 11 x 42-inch sections, was used for all treatments applied in the laboratory, excepting one

*Contribution from Bureau of Chemistry and Soils of the United States Department of Agriculture.

†Count; warp 54 threads per inch, filling 40 threads per inch. Ply, warp 2, filling 2.

treatment (No. 27 of Table 4) which was applied to eight-ounce United States standard army duck that had been mineral dyed with chromium and iron by a commercial dyer.

Treatments represented by samples 1 to 8 (Table 2) and 10 to 26 (Tables 3 and 4) were applied as follows:

The 11 by 42-inch section of cotton duck was thoroughly soaked for five minutes in water at 40° to 45° C. containing a commercial wetting-out agent of the sulfated higher alcohol type. It was then passed through a clothes wringer having rubber-covered rollers and, without drying, was impregnated thoroughly for five minutes in 1,500 cc. of the cold treating solution containing one or more of the metal compounds. The fabric was then passed through the clothes wringer to remove excess of solution and then air-dried for two hours by hanging in the laboratory. A number of the samples containing pyrolignite of iron, after partly drying, were "steamed" by placing them in a closed tank and allowing steam at atmospheric pressure to play on the fabric for seven minutes. Samples containing chrome alum or ferric sulfate were not steamed because it was found that the acid reaction of the treating solutions containing these chemicals caused tendering of the fabric under the influence of heat. Steaming drove from the fabric free acetic acid and probably caused some formation of iron and chromium hydroxides. The fabric was then after-treated by immersing for ten minutes in 1,500 cc. of cold or hot sodium carbonate solution. It was again squeezed and washed thoroughly with tepid water under the spigot and then allowed to soak for forty-eight hours in tap water. The water was changed several times during this period. The treated fabric was again passed through the clothes wringer and allowed to air-dry by hanging in the laboratory.

When hot sodium carbonate was used the solution was near the boiling point when the fabric was immersed in it. It was found necessary to use hot sodium carbonate whenever the treating mixture contained chromium acetate because chromium hydroxide does not form readily upon adding cold sodium carbonate to chromium acetate.

The waterproofing treatments (Table 5) were prepared and applied in the same way as previously described by Jarrell and Holman[2, 3].

Five untreated samples of cotton duck were taken from various sections of the bolt for use as controls. They were washed and soaked in water in the same way as were the treated samples.

Each of the untreated and treated samples was cut into two subsamples. One set of subsamples, marked "unexposed", was kept in a constant temperature and humidity room maintained at 50 per cent relative humidity and 70° F. continuously up to the time of making the mildew resistance tests. The other samples (excepting No. 1-1, Table 2) marked "exposed" and measuring 11 x 12 inches, were attached to a 12-by 12-foot wooden frame supported by posts (See Figure 1) and exposed continuously to the weather in the open country near Washington, D. C.,

Fig. 1—Samples on Frame for Weather Exposure

for six months beginning March 31, 1936. The frame was slightly inclined from the horizontal, being higher on the north (6 feet from ground) than on the south side (4 feet from ground), and was fully exposed to the rays of the sun throughout the day. At the end of six months' exposure the subsamples, none of which showed spontaneous mildew growth, were detached from the frame, brought to the laboratory and tested for mildew resistance in comparison with the unexposed subsamples. Quantitative determination of copper was also made on all unexposed and exposed subsamples to which copper compounds had been added in the treatment.

For determining the mildew resistance of the unexposed and exposed subsamples, the procedure developed in the Department of Agriculture by Thom, Humfeld and Holman[4] was used as described except for a modification in the composition of the mineral nutrient agar employed which was as follows:

Distilled water	1,000	ml.
$NaNO_3$	3.0	grams
K_2HPO_4	1.0	gram
$MgSO_4$	0.25	gram
KCl	0.25	gram
$FeSO_4$	0.01	gram
Agar	5.0	grams

Briefly, the method for testing mildew resistance comprises the following steps: Autoclave sterilization of fabric cut into 4 x 1¼ inch strips in warp direction; implantation of strips on the surface of a mineral nutrient agar, in petri dishes, previously inoculated with the spores of *Chaetomium globosum;* incubation for 14 days at 28-30° C.; raveling down to a definite number of warp yarns representing one inch of the original fabric; conditioning at 50 per cent relative humidity and 70° F. for 48 hours or longer; and testing the strips for tensile strength in comparison with sterilized controls.

All strips were ravelled down to exactly 54 threads (the equivalent of one inch) before tensile strength tests were made on them. The strength tests were made with Schopper machines having capacities of 50 and 100 kilograms. Strips having relatively low strength were broken with the machine of lower capacity, and those having relatively high strength were broken with the machine of higher capacity.

The effect of mildew upon the tensile strength of the fabric is expressed as percentage loss (or gain), calculated from the tensile strengths of the inoculated and incubated strips and of the sterile control strips used as the basis of comparison.

Tensile strength tests on a number of representative unexposed and exposed subsamples showed that sterilizing them in an autoclave at 15 pounds pressure for 30 minutes (the conditions used in the mildew resistance tests) caused no reduction in strength. Therefore, the loss in strength from exposure to the weather for six months, as recorded in the last column of the tables, was calculated from the strength of the exposed sterile control strips using the strength of the unexposed sterile control strips as the basis of comparison.

Copper was determined in the nitric acid soluble portions of the ash of from five to ten grams of the fabric by the well-known potassium cyanide method described by Sutton[5]. This method depends upon the decolorization of ammoniacal blue solution of copper by a standard potassium cyanide solution. The nitric acid extract was made slightly alkaline with sodium carbonate and then one cc. of strong ammonia was added. As pointed out by Sutton, it is impossible, in the case of solutions containing iron, to separate by one precipitation, filtration and washing the iron precipitate formed by the addition of sodium carbonate and ammonia without some copper being occluded with it. It was not possible to titrate satisfactorily the copper solution in the presence of the iron precipitate as suggested by Sutton. For this reason the washed precipitate was dissolved from the filter with dilute nitric acid, and sodium carbonate and ammonia were again added. The precipitate was again filtered off and washed. This procedure was repeated until no further copper was detected in the filtrate. Each filtrate containing copper was titrated separately with standard potassium cyanide. The percentage of copper present was calculated on the basis of the moisture-free weight of the treated fabric from the total amount of standard potassium cyanide used in the titrations. (See second column from the right of Tables 3, 4 and 5.)

RESULTS

The results on the effect of artificially induced mildew upon the tensile strength of five subsamples of untreated gray 8-ounce U. S. standard army duck, before and after exposure to the weather for six months, are recorded in Table 1. These subsamples were taken from various sections of one 50-yard piece. In Table 2 are presented results of similar tests on *copper-free* mineral dyed duck, before and after exposure to the weather for the same period. The results on the effect of artificially induced mildew upon the strength of *copper-treated* duck (impregnated with various strengths of cupric acetate and after-treated with cold or hot sodium carbonate) before and after exposure to the weather for six months, are recorded in Table 3. In Table 4 are presented results of similar tests on *copper-containing* mineral dyed duck before and after exposure to the weather for six months. In Table 5 are recorded results on the effect of artificially induced mildew upon the tensile strength of *copper-free* and *copper-containing* waterproofed gray duck, before and after exposure to the weather for six months.

DISCUSSION OF RESULTS

It should be noted that there was apparently no spontaneous growth of mildew on any of the untreated or treated samples during or after exposure to the weather for six months, and any loss in strength from exposure shown in the last column in the tables cannot be attributed to mildew.

Untreated Control Samples

The results in Table 1 show that artificially induced mildew on the five pieces of untreated and unexposed gray duck caused a great loss in tensile strength, ranging from 83.8 per cent (No. E-1) to 89.8 per cent (No. A-1). The average loss was 86.4 per cent. The subsamples exposed to the weather for six months and then tested in the laboratory showed some mildew resistance in comparison with the unexposed subsamples. The loss in tensile strength resulting from inoculation and incubation was much less, ranging from 40.9 per cent (No. C-2) to 47.3 per cent (No. A-2). The average loss was 43.8 per cent. It is interesting to note that in every case the strength of the inoculated and incubated exposed subsamples was greater than was that of the inoculated and incubated unexposed subsamples. In most cases this was also true for the treated samples to which copper had not been added (see Tables 2 and 5). From these results it appears that the organism *Chaetomium globosum* does not attack cotton fibers which have become degraded and weakened by sunlight to the same extent as it attacks new, unweathered cotton fibers.

The loss in strength of untreated duck from exposure to the weather for six months ranged from 43.2 per cent (No. E-2) to 51.7 per cent (No. B-2), the average being 46.1 per cent.

Copper-free Mineral Dyed Samples

The results recorded in Table 2 show that the fabric mineral dyed with chromium and iron compounds, either alone or mixed, had no mildew resistance when tested by the laboratory method. Unexposed subsamples treated with chromium alone showed a loss in strength from inoculation and incubation of from 82.9 per cent (No. 2-2) to 93.5 per cent (No. 2-1), whereas the unexposed untreated control lost 86.4 per cent in strength. Unexposed subsamples treated with iron compounds alone showed a loss in strength from inoculation and incubation of from 79.4 per cent (No. 4-3) to 91.5 per cent (No. 3). The loss in strength of the inoculated and incubated unexposed strips which had been treated with mixtures of various proportions of chromium and iron compounds, including one sample (No. 9) mineral khaki dyed by a commercial dyer, was from 79.5 per cent (No. 6) to 92.8 per cent (No. 8-1).

It is interesting to observe that the exposed subsamples

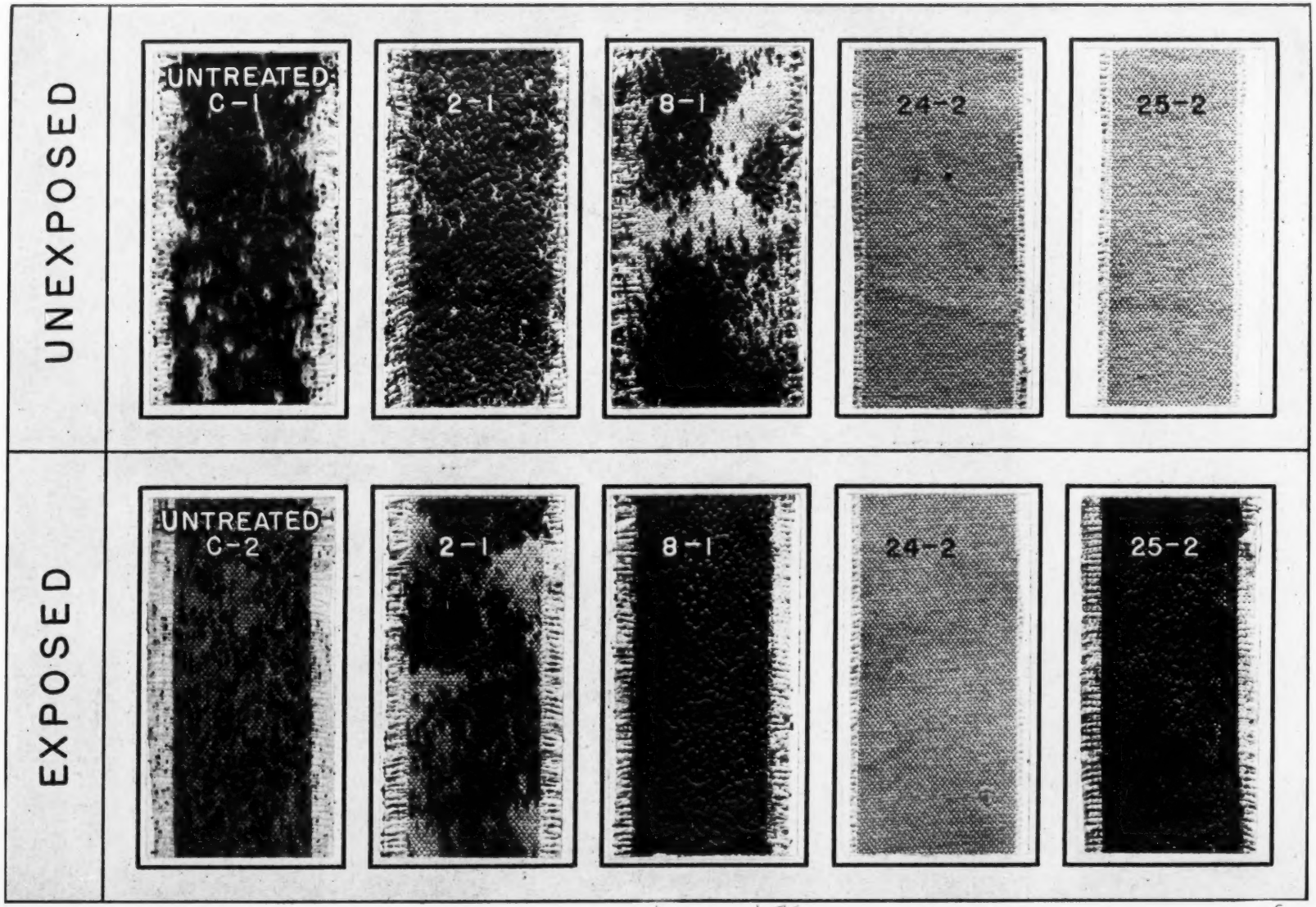


Fig. 2—Appearance of Fabrics After Inoculation with *Chaetomium Globosum* and Incubation for Two Weeks. (Numbers identifying samples are listed in tables.)

TABLE 1

Effect of Artificially Induced Mildew Upon the Tensile Strength of Untreated Gray 8-Ounce U. S. Standard Army Duck, Before and After Exposure to the Weather for 6 Months

Subsample No. (All subsamples from one 50-yard piece)	Condition of portion tested as regards exposure to weather	Effect of mildew on strength: 1-inch strips, warp yarns: Sterile controls Kg.	Inoculated with Chaetomium globosum and incubated Kg.	Loss in strength from inoculation and incubation Per cent	Loss in strength from exposure to weather† Per cent
A-1	Unexposed	56.0	5.7	89.8	
A-2	Exposed*	29.4	15.5	47.3	47.5
B-1	Unexposed	57.4	8.3	85.5	
B-2	Exposed	27.7	16.2	41.5	51.7
C-1	Unexposed	54.0	8.1	85.0	
C-2	Exposed	30.3	17.9	40.9	43.9
D-1	Unexposed	55.2	6.5	88.2	
D-2	Exposed	30.8	17.7	42.5	44.2
E-1	Unexposed	54.8	8.9	83.8	
E-2	Exposed	31.2	16.6	46.8	43.2
Average	Unexposed	55.5	7.5	86.4	
	Exposed	29.9	16.8	43.8	46.1

*All subsamples marked "Exposed" in this table and all subsequent tables were exposed on a frame near Washington, D. C., for six continuous months beginning March 31, 1936. This frame was slightly inclined from horizontal, being higher on the north than on the south side, and was fully exposed to the sun.

†The percent loss in strength from exposure to the weather for six months was calculated from the strength of the uninoculated and sterile controls. Loss in strength from exposure to weather and loss in strength from mildew are not additive because exposed subsamples were stronger after inoculation and incubation than were unexposed subsamples after inoculation and incubation. There was apparently no spontaneous growth of mildew on the subsamples during weather exposure.

which had been treated with chromium compounds alone (Nos. 1-1, 1-2, 2-1 and 2-2), and the commercially mineral khaki dyed sample containing both chromium and iron (No. 9), showed much more tendering upon inoculation and incubation than did the exposed untreated samples, the loss in tensile strength being 77.4 per cent (No. 2-2) to 86.5 per cent (No. 2-1), in comparison with 43.8 per cent for the exposed untreated control. All other chromium-and-iron treated or iron-treated exposed subsamples shown in this table compared favorably, as regards loss in strength upon inoculation and incubation, with the untreated exposed control, the loss being 32.6 per cent (No. 6) to 57.0 per cent (No. 4-2). None was materially better than the untreated fabric.

Chromium compounds alone showed some preservative effect on fabric exposed to the weather for six months, the loss in strength of the treated samples being only from 20.8 per cent (No. 2-2) to 34.5 per cent (No. 1-2) compared with 46.1 per cent for the exposed untreated control. On the other hand, pyrolignite of iron (black iron liquor) tendered the cloth considerably upon exposure to the weather for six months. This was true regardless of whether the cloth had been steamed or not steamed before treating with sodium carbonate, and whether the alkali used in precipitating the iron on the fabric was cold or hot. The loss in strength of these samples, resulting from exposure to weather, ranged from 73.5 per cent (No. 4-4) to 82.3 per cent (No. 4-1). The sample (No. 3) treated with ferric sulfate alone showed much less loss in strength from weathering than did those treated with pyrolignite of iron, the loss being 61.4 per cent in comparison with 46.1 per cent for the exposed untreated control. None of the unexposed samples, similarly treated, showed a loss in strength after storage in the laboratory for the same length of time. The addition of chromium compounds to the pyrolignite of iron solution tended to diminish the deteriorative effect of the latter upon the fabric during weather exposure. (Compare No. 4 with Nos. 5, 6 and 7.)

Copper-containing Gray and Mineral Dyed Khaki Samples

In Tables 3 and 4 are presented the results obtained with unexposed and exposed cotton duck which had been treated with various amounts of copper compounds alone (Table 3) and with mineral khaki dyeing solutions containing various amounts of copper (Table 4). When cold sodium carbonate solution was used for precipitating the copper on the fabric, green basic copper carbonate was formed, and when the hot alkali was used black cupric oxide (CuO) was formed. Both of these compounds are insoluble in water.

In Table 3 it will be observed that the copper content of the unexposed portions of the treated samples varied from 0.19 per cent (No. 15-2) to 2.90 per cent (No. 10-2). None of these unexposed portions of the treated samples showed loss in strength upon inoculation and incubation. Sample No. 10-3, treated with a seven per cent cupric acetate solution, contained 1.67 per cent of copper before exposure to the weather, but only 0.11 per cent of copper after six months' exposure. The exposed portion, however, still retained its mildew resistance as evidenced by no reduction in strength upon inoculation and incubation. The copper content of samples treated with five per cent and weaker solutions of cupric

TABLE 2

Effect of Artificially Induced Mildew Upon the Tensile Strength of Copper-Free Mineral Dyed 8-Ounce U. S. Standard Army Duck Before and After Exposure to Weather for Six Months

Sample No.	Treatment applied: Impregnated with: Chromium-Potassium Sulphate (Chrome alum) solution sp. gr. 1.146 Per cent vol.	Chromic acetate solution sp. gr. 1.162 Per cent vol.	Ferric sulfate solution sp. gr. 1.450 Per cent vol.	Pyrolignite of iron solution sp. gr. 1.070 Per cent vol.	Water Per cent vol.	Steamed	After-treated with sodium carbonate solution Cold or hot	Condition of portion tested as regards exposure to weather	Effect of mildew on strength: 1-inch strips, warp yarns: Sterile controls Kg.	Inoculated with Chaetomium globosum and incubated Kg.	Loss in strength from inoculation and incubation Per cent	Loss in strength from exposure to weather Per cent
Untreated control					100			Unexposed	55.5	7.5	86.4	
								Exposed	29.9	16.8	43.8	46.1
1-1	75				25	No	Cold	Unexposed	51.6	4.3	91.7	
								Exposed	....	....	....	....
1-2*	75				25	No	Cold	Unexposed	62.0	7.5	87.9	
								Exposed	40.6	9.4	76.8	34.5
2-1		50			50	Yes	Hot	Unexposed	58.6	3.8	93.5	
								Exposed	43.8	5.9	86.5	25.3
2-2*		50			50	Yes	Hot	Unexposed	59.7	10.2	82.9	
								Exposed	47.3	10.7	77.4	20.8
3			33		67	No	Cold	Unexposed	58.5	5.0	91.5	
								Exposed	22.6	10.3	54.4	61.4
4-1				50	50	Yes	Cold	Unexposed	52.0	9.3	82.1	
								Exposed	9.2	4.8	47.8	82.3
4-2				50	50	No	Cold	Unexposed	52.2	9.1	82.6	
								Exposed	12.1	5.2	57.0	76.8
4-3				50	50	Yes	Hot	Unexposed	52.8	10.9	79.4	
								Exposed	11.1	5.0	55.0	79.0
4-4				50	50	No	Hot	Unexposed	51.7	9.0	82.6	
								Exposed	13.7	6.0	56.2	73.5
5		50		50		Yes	Hot	Unexposed	52.4	10.2	80.5	
								Exposed	22.3	13.0	41.7	57.4
6		25		50	25	Yes	Hot	Unexposed	51.1	10.5	79.5	
								Exposed	19.3	13.0	32.6	62.2
7		12.5		50	37.5	Yes	Hot	Unexposed	53.1	10.3	80.6	
								Exposed	19.3	10.5	45.6	63.7
8-1	18.75		10	15	56.25	No	Cold	Unexposed	59.8	4.3	92.8	
								Exposed	31.2	15.0	51.9	47.8
8-2	18.75		10	15	56.25	No	Hot	Unexposed	59.7	6.3	89.4	
								Exposed	30.7	13.4	56.4	48.6
9	8-ounce U. S. Standard Army Duck, mineral dyed with chromium and iron by a commercial dyer							Unexposed	45.7	6.3	86.2	
								Exposed	25.0	5.7	77.2	45.3

*Samples 1-2 and 2-2 were given a double treatment, i.e., after being treated once with the chromium compound, followed by sodium carbonate, they were treated again in the same way.

(Continued on page 519)

Dyeing Logwood Blacks

on Silk and Rayon Materials

F. P. W. WILSOME

IN spite of the availability of various coal tar black dyes by means of which excellent black shades can be produced on real silk, viscose and acetate rayons, the old-time natural dye logwood is still being used to a considerable extent for producing black on these textile fibers. The only explanation of this continued use of a natural dyestuff instead of the synthetic dyes is that it has some special valuable characteristics connected with its application or the shade produced by means of it. Actually the rich bloomy shade of the black obtainable by means of logwood cannot be surpassed or even equalled by that of the other dyes. Further, a logwood black can in certain circumstances be produced very easily and cheaply and on these grounds logwood makes a special appeal to the dyer. In this article it is proposed to give details of some methods based on our own experience in which logwood is used to produce good shades of black on silk and rayon and their mixture materials.

For dyeing a good pleasing black on real silk it is much preferred to use logwood rather than any other dye and, in general, the dyeing process gives practically no trouble. The following is the method used.

Firstly, the silk material (fabric) is boiled for one-half hour in a 1 per cent solution of soap flakes so as to remove the gum. It is then thoroughly washed and immersed in a cold "iron" liquor prepared by adding 10 gallons of iron liquor (this usually has a specific gravity of 1.15) to 50 gallons of water. Steeping this liquor for one hour is usually sufficient but this treatment can vary within wide limits without making much difference to the resulting black shade. The silk fabric is then withdrawn and rinsed twice in cold water to which a small amount of sulfuric acid is added—just sufficient to make the liquor acid. This is followed by two further washes in cold water, and finally the fabric is treated with a warm soap liquor so that it is ready for the application of the logwood.

The previous treatment has resulted in a deposition of a basic iron soap compound in the silk and this is then ready to form a black lake with the logwood about to be applied.

A fresh soap liquor is now prepared and to this is added about 10 ounces of fustic extract and 1 lb. of logwood. The iron mordanted silk is entered near to the boil and dyeing continued until a portion cut off and dried is seen to have the desired depth of shade. The black fabric is then thoroughly washed with hot water or a dilute soap liquor to remove any loosely adhering logwood and this end is achieved when it is seen that the washing liquor is substantially colorless.

In most instances it is required that the black dyed silk fabric shall have a scroop handle and this is obtained by simply treating the fabric with a slightly acid liquor containing acetic acid.

The addition of the fustic as described above is for the purpose of improving the logwood black shade; the fustic contributes just the necessary amount of yellow to prevent the logwood black from appearing bronzy. Of course, the dyer will have to vary the proportion of fustic added so as to suit the particular brand of logwood being used.

When viscose rayon fabric is treated in the same manner as for real silk it is found that only a thin shade of black is produced. This is because of the much smaller affinity of the rayon for iron and logwood. It is therefore found that in dyeing logwood black on real silk and viscose rayon mixture fabrics there is a lack of balance between the shades on the two fibers. But this can be overcome very easily by afterwards topping up the rayon with a suitable direct black dye.

The black dyed silk fabric should be immersed in a hot solution of the suitable dye containing a small amount of soap until a portion cut from the fabric shows both fibers to be equally dyed.

Turning now to acetate rayon fabric, it is possible to dye this with logwood black satisfactorily. But in employing this dye it is essential that there is quite a long run of fabric to be dyed; otherwise the process is somewhat expensive. The dyeing procedure consists of dyeing the acetate rayon material either in a jigger or a winch machine with a 4 per cent (calculated on the liquor) solution of logwood (a special type of the dye is preferred) under the usual conditions of time and temperature (about 75° C.) until its acquires a fairly deep brown shade. The rayon fabric is then further treated for about one-half hour in a 2 per cent solution of sodium bichromate at 75° C. whereupon the logwood gradually changes to a deep pleasing black shade which can be afterwards soaped and so made more bloomy.

The drawback to this process is that exhaustion of the

logwood bath is far from complete and unless this bath can be used over and over again (after replenishment by suitable additions of logwood) the wastage of logwood makes the process too expensive. But where a standing bath is possible on account of the large amount of fabric to be dyed the logwood process has much to recommend it.

It has been stated that a good black can be obtained by this process on a fabric consisting of a mixture of viscose and acetate rayon but we have no experience of this. For such mixture materials, use is made of a diazotizing and developing black for the acetate rayon and a direct black for the viscose rayon which withstands this developing process or is improved by it. The mixture material is dyed in one bath with the two different types of dyes and the shade is then developed in the usual manner with sodium nitrite and hydrochloric acid, followed by development in a solution of the sodium salt of beta-oxynaphthoic acid made slightly acid by addition of acetic acid.

More recently, a useful discovery (E. P. 440,594) enables improved black shades to be obtained on acetate rayon by means of logwood. It has been found that when dyed in the usual manner slight variations in the nature of the afterchroming process can lead to the production of shades having an inferior fastness to light. Also, when the logwood black is applied to matt acetate rayon the pigment formed within the rayon has the effect of restoring a certain proportion of luster to the rayon. It is possible to avoid these disadvantages by having present in the afterchroming liquor a small amount of oxalic acid or an oxalate; in certain cases the same beneficial effect is obtained by using ammonium thiocyanate.

A good black shade can be produced in the following manner on acetate rayon fabric:

First, the fabric is dyed at 80° C. with a 10 per cent solution of haematin crystals (a logwood preparation) for about one hour and until the rayon acquires a deep brown color. It is then further treated for one-half hour at 75° C. in a bath containing 2 per cent of sodium bichromate and 1½ per cent of sodium oxalate. The fabric (now deep black) is rinsed and soaped.

It is interesting to note the further claim that the presence of magnesium sulfate in the logwood bath results in a black shade somewhat faster to light; possibly this is due to the formation of a magnesium logwood lake.

Printers can adopt the same process. In this case, the acetate rayon fabric should be printed with the following paste:

Haematin	10 lbs.
Glycerine	5 lbs.
Glucose or dextrin.....	25 lbs.
Water	6 gallons

The fabric is then dried and steamed for 15 minutes at 5 lbs. pressure. Afterwards it is treated with sodium bichromate and an oxalate as described above.

It is important that the degree of chroming should be controlled within reasonable limits since either under- or over-chroming results in black shades having less than the highest possible fastness to light. The amount of sodium bichromate should therefore be in excess of that which could be reduced by the amount of oxalate present. It is suggested that for 1 to 4 per cent of sodium bichromate there should be used 1 to 3 per cent of an oxalate.

In concluding this article it may be suggested that while logwood can be generally recommended for producing an all-round satisfactory black on real silk, it is rather for special cases (for frequent or long runs of fabric) that this dye is to be used on acetate rayon.

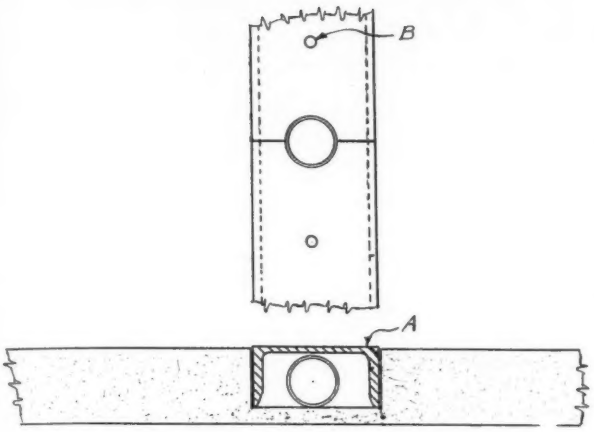
Pipe Lines

in Concrete Floors of Dyehouses

JOHN E. HYLER

THE possibility of installing various kinds of pipe lines in concrete floors is one of great interest to many, when a method can be found which will allow it to be done advantageously, leaving an unbroken floor surface, one that can be trucked over with heavy loads and that will therefore do for industrial piping of any kind. It matters not whether the lines be for air, liquids or steam, the principle remains the same. However, in the case of steam pipes, it would seem to be of interest as touching heat radiation, for it would result in part of the heat being liberated at a point actually below the floor line, and this would be a point in good practice.

However, convenience is paramount in the idea, for pipe lines can be laid in this manner on a natural floor support in the bottom of a channel as shown, either singly or in multiple. While the channel molded in the floor is here shown made large enough to receive one inverted channel iron only, it can be made with enough to accommodate several channels laid side by side in inverted position, in like manner.



Where there is excessively heavy trucking that may tend to break down the corners of the floor next to the channel iron, the circumstance can readily be met by the use of two channels, one of which is small enough to nest into the other. The first channel would be set right into the concrete, open side up, and the smaller one would be inverted to fit down into it. The pipe, in such case, of course, would lie within the larger channel.

It will be noted that the channel shown at A is made loose enough to fit in the concrete channel that it can be lifted from place in order to make repairs or changes to the pipe line beneath should the occasion arise. Holes drilled through the channel at intervals of four or five feet, as at B, large enough to allow the insertion of a lifting hook, will make the matter even more handy.

Where a pipe rises from the floor to a machine or elsewhere, the channel will be divided or cut in two pieces neatly, and enough metal will be removed from each channel end to allow it to house halfway around the pipe riser, as at C, or any fittings that may be involved. Such fitting is a very simple trick in these days of the acetylene cutting torch, and can be very quickly done.

Senseless Things

I Have Been Asked to Do

NOEL D. WHITE

THERE are people who have dreams, day and night, which they wish would come true; ideas by which they think to improve their work, do things better, faster and easier than they have been done before, as if by magic. They believe, because someone has stumbled upon something useful, or has successfully achieved fame and fortune by deviating from the beaten path, that they can do the same without proper preparation, even without knowing what it is all about. They do not stop to figure out that Henry Ford, for example, was a good mechanic before he conceived the idea of using a gas motor, instead of a steam engine, to propel a horseless carriage, and that Edison and Marconi were expert physicists and knew all the answers before they started working on their wonderful discoveries. I happened to be connected with some such individuals and they were, to use a familiar expression, "pains in the neck."

One was Mr. —— the superintendent of a ribbon mill where I was in charge of the dyeing. His stronger claim to his position was that, through his connections, he could dispose of most of the production of the mill. He had no mechanical ability, he was not even a weaver, but he could hire the best mechanics, loom-fixers and weavers to do his work, and with a good finisher the mill was doing as well as the average.

The first inkling I had of this man's inventive propensities was when my curiosity was attracted to a corner in the weaving shed, that was partitioned off and into which nobody was allowed to enter. I found out that this man was trying to perfect a high speed, all metal ribbon loom that he wanted to patent, claiming that it was going to revolutionize the ribbon industry. Mr. —— furnished the ideas, a machinist from outside the mill was doing the work as directed by Mr. ——. After many trials, changes and squandering the profits of the mill over a period of two years the loom was declared to be a failure. His idea was that a loom to run at the speed he wanted had to be wholly of metal, but with every trial the harness and warps went to smash and the loom was finally scrapped, and with it went the superintendent. This, however, had nothing to do with me.

What concerned me was that one day Mr. —— came to the dyehouse and asked me if I knew how to dissolve silk. Not knowing what he was aiming at I told him that silk could be dissolved in a solution of copper glycerol or in hydrochloric acid. Then he told me what he had in mind. He said: "We make a lot of waste here, in the winding and weaving rooms, which is a total loss to the mill. I have just found out that this waste can be dissolved in a solution of zinc and hydrochloric acid. If you will do that for me I intend to use that dissolved silk to finish ribbons with it. I believe we can put that silk on the surface of our ribbons to improve the feel, luster and quality, and make a better ribbon with very little extra

cost. In other mills ribbons are loaded with chemicals; we are going to load them with real silk. The waste is wasted anyway, if we can use it it will be another feather in our cap!"

My argument that the chemistry involved in preparing what he wanted required a great deal of thought and preparation, besides some pieces of apparatus we did not have; that dissolving the silk would be easy, but if he wanted to use it for finishing it had to be precipitated out of the solution first, than washed and mixed with some colloid so it could be applied properly as a finish; that it was the work of a chemical engineer; it all fell on deaf ears. He told me that I was imagining difficulties. He produced a volume from a set of a popular science publication which he consulted whenever he had one of his pipe dreams, and told me all he wanted me to do was to dissolve the silk and let him have the solution. He would find how it could be used. I was glad to let him have all the glory . . . and the responsibility . . . I dissolved a pot of silk waste and gave it to Mr. —— and that was the end of that.

He never told me what the result had been. Shortly after that he was told to take himself and his inventive genius to some other mill. When I inquired what result they had with the dissolved silk I learned it was not much of a success. The truth was that several rolls of perfectly good ribbons had been ruined.

A Little Knowledge Is Worse Than None

Mr. ——'s successor in the mill was a relative of the owner. A promising young man, willing and alert, whose managerial ability yet was in an embryo state. His knowledge of textiles was what he had learned around the mill here in less than two years; had learned a little of everything and had a lot of confidence in himself (or was it ego?).

His first trouble was to find a finisher to take the place of the one we had, who refused to work under the new manager and had left with Mr. —— without giving any notice.

That finisher used to prepare his own finishing paste. Every night he came to the dyehouse with two buckets and a few sheets of carpenter glue, which he divided into the two buckets, added to the glue some soap which he shaved from a bar of my olive oil soap, filled the buckets with water and brought them back to his finishing room, to let the stuff soak overnight. I felt quite positive that that was all the finish he used on his ribbons. In the morning he brought the buckets back to the dyehouse, boiled the content of them for a few minutes, until dissolved. In using it he diluted the solution with warm water, as he poured it into two troughs, one on each side of the finishing frame, from which it was blown with atomizers into a misty cloud. The ribbons were passed through the mist while they were pulled on and over a hot drum to dry, and from there to rollers, where the finished ribbons were finally rolled up. The only secret was to keep in the trough a solution of the proper consistency, at the right temperature, and the atomizers so adjusted to produce a steady, vapory mist.

The new manager, who had helped in finishing at various times, thought he could handle that department easily enough, but he soon found that he could not get the same results. After several trials he felt convinced that there was some ingredients the finisher used, and of which nobody was wise. He had the two full pails the finisher had prepared the night before, as usual. He brought one to me and asked me if I knew what was in the pails beside soap and glue. I answered that I didn't know there was anything else, but he was sure there must have been and we must find out. He added that he knew, and everybody else knew, that the old finisher came in every morning with a package under his arm (which I knew was his lunch). "That must have been what he used in his finish and of which we don't know anything about" . . . And then in a patronizing way he added: "You must help me now. I heard you are a student of chemistry, and that you have a laboratory at home. I want you to take this home and analyze it, and find out what he has in it. We have enough ribbons on hand and you need not dye anymore for a while. Take your time and you report in the morning."

The absurdity of that request left me speechless. I watched him leave the dyehouse, and then I could not help myself from bursting out laughing, before I decided what to do. My knowledge of chemistry at that time was not such that I could start an analysis of that kind. Besides there could not possibly be anything in that pail than what we already knew, since the finisher had not shown up that morning. Yet I had to do something, because it was of no use to argue with that young and inexperienced manager. The thought came to me that I could handle that finishing myself if I was given a chance to make a few trials. I decided to act on that hunch. I called my most trusted helper and asked him how he would like to be the boss finisher? He answered that he would like it very much, but what he did know about it could be told in just one word: Nothing. "Well," I said, "neither do I, but we both have helped in there at several occasions and we can learn, if we can put our minds in it. Anyway we have a good chance now and we will make good."

An Analysis Performed on a Fishing Trip

"The boss has given us a day off," I told my helper, "you and I are going on a fishing trip. We will work out a way while we are out on the river bank." And so we went fishing. On our return we had a plan devised that proved of value to me, my assistant and the mill.

Working on my assurance that the other man had nothing but glue and soap in his finish I made out a report, of the analysis requested, using symbols and chemical names, writing out a ponderous formula for soap and glue, to make it impressive, assuaging my conscience that the cause justified the means, and faked or not, all they required were results, and these we were going to get.

(Continued on page 524)

PROCEEDINGS OF THE
American Association of Textile Chemists and Colorists

AUGUST 23, 1937

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A. E. Shumate, Chairman; J. W. Furr, Secretary

Philadelphia Textile School Student Section
John L. Waldo, Chairman; Wayne F. Fry, Secretary

Members should notify **Secretary** immediately of all address changes

Calendar of Coming Events

Fall Meeting, Piedmont Section, Carolina Hotel, Pinehurst, N. C. November 6, 1937.

Annual Meeting and Convention, December 3 and 4, 1937, Bellevue-Stratford Hotel, Philadelphia, Pa.

The Textile Chemist in Court*

JOSEPH F. X. HAROLD†

I HAVE no hints on making things easier for a chemist who is summoned to court as an alleged criminal. I do hope, however, to be able to help in some way the younger chemist who might expect to start a career of appearing in court as an expert in chemical cases, or in helping men who have not yet had an opportunity of this type. My advice is founded not so much on any particular gifts in the matter, but by a long, if not useful, career in that line. I have been going to court for about forty years.

Personal preparation for court work demands a love of the specialty in which a man presents himself. Naturally, he should have experience in the specialty, in the preparation of suits for others. That is the way almost anybody starts, by working for another man. He must have something of a love of debate, which is not a mere love of speaking, but involves good listening for weak points. A mere love of talking can never make good listeners.

Another good preparation for court service on the part of the textile chemist is jury service. It is an element of training that is very useful. Even the lawyer doesn't get this. Don't miss its valuable education for the technical witness. It gives him a court sense that he will never otherwise get. The signs of mass thinking, the judgment of what is going on in the minds of twelve men before you is very good and useful to you later, and only a juryman is likely to get that sense.

Then some specialty should be pursued intensely by the young textile chemist who intends to work in court. Read all that you can get about one subject. Join all technical societies that you can afford, and get to be known by work and by articles as an authority, if possible, on some one branch of your technology, no matter how narrow. There is much unexplored territory open. Many fields lack standards of practice, unity of methods, instruments of measurement, or exact criteria of quality. Much trade practice is medieval. Rule-of-thumb methods prevail. Definitions are lacking or vague, and testing is often as temperamental as tea-testing.

Then, he should try to familiarize himself by study, not in books so much as in current magazines, with the most modern methods of analysis: the X-ray, observation under U.V., the spectrophotometer, micro-analysis, color analyzers and recorders, pH measurement, industrial control of processes with the various newer instruments by which this is secured. Many a man who left college ten years ago now finds himself outmoded as to the newer instruments. In this connection, luckily we have our universities in town here which offer evening courses. A man who has been out of college for twenty years knows very little from personal experience in college about pH. He can get that from courses in physics at night in our municipal universities.

A knowledge of the properties of materials or a library technique which allows ready reference to the most varied data must be supplemented by a sense of their correlation and significance in a given problem. Reading without judgment is little better than reading without understanding.

Then, he should be an omnivorous reader of science as exhibited in journals and abstracts, rather than in textbooks. He should be familiar with the Patent Office Gazette and trade catalogs. These represent the fruit and utilization of science. Textbooks lack the up-to-dateness and the actuality that the journals have, but are better and more authoritative supplements to opinion in court. That is, the journals are not brought into court as authorities as much as the textbooks. He should know his textbooks and his subject when he wants to quote authorities in court. Judges as a rule are much more impressed by an article, or a paragraph in a textbook than they are by a current journal, and jurors are similarly influenced.

He should have, if possible, as preliminary to his court experience, some experience in "trouble-shooting". Nothing is a better support to the well-grounded and educated technologist than this, with respect to his testimony in damage suits. Tracing faults in a mill through supply and process, auxiliary materials and analysis of product, is an ideal training for localization of damage and consequent fixing of responsibility—the kind of damage, the cause of damage, the place and degree of damage. Good judgment in all of these things comes to a man who has been trained in trouble-shooting in the mill.

He should, for good reasons, establish social connections with leading technologists, men who are specialists in his science. There is much in the texts, in the journals and even in the patents that is misleading, or useless or

* Presented at meeting, New York Section, May 21, 1937.
† Wm. M. Grosvenor Laboratories, Inc.

diffuse. The boiled down, abstracted wisdom, free of chaff and speculation is in the minds of men in professional practice, in trade, in factories, often as workmen. The key to this is in your technical groups, with their meetings, lectures and consequent contacts. Cultivate them.

He should have a love and appreciation of the law as a subject of study and as a profession. The study of law in its roots and development through history is a liberal education in itself. Most other professions are technologies, not necessarily cultural at all.

Patent applications call for the most precise use of language. The brilliance of the inventor bears fruit only under the aegis of the lawyer, who often needs a wider flight of imagination than the patentee himself to secure and guard him against simulative matter. Here, faulty English and restricted imagination are often most heavily fined by competition that might have been forestalled.

The most useful and noblest employment of the human mind is in the securing of justice, and as the strength and agility of the human body reach their peak in preparing for a contest with the attendant sanctions of profit or punishment, so the human mind attains its greatest glory in the lawyer preparing for a legal battle, with the urge of victory and appreciation of the profession to spur him to his best endeavor.

Lastly, but in no minor degree, the expert witness in any technology should bring to court a well considered reverence for the judge, not necessarily for his person, but for his office. That dignity is matched only by the ministry. He comes nearer to functioning as a providence than a king, and in his office "earthly power shows likest God's." Even in our lower courts, one may often listen to a judge's charge to the jury, a masterpiece of language, of ripened wisdom, of cogent reasoning, purged of all irrelevancies, no bit of evidence forgotten, no telling point overlooked, imbued with the essence of immanent justice, as if its spirit hovered near, clear as the upper air and as free from bias and the mental frailities of our common speech as men may dare to hope for.

For whom does the chemist in court usually work? Primarily, the chemist serves the lawyer. Frequently, however the technological evidence is only a minor implement in the legal battle. While the chemist should have enthusiasm, interest and optimism concerning his relation to the case, and the importance of his work, he is only the ammunition maker, serving a restricted number and kind of guns. The lawyer is both general and artilleryman. He, only, gives the final judgment on the range, the direction, and the destructive power of the shots.

The means of getting work usually follow from his connections—his teacher, his students, or his employees. He may get work from a firm which his employer supplies, or customers or people who supply his employer with material. He may be assistant consultant and the paternal kindliness of his chief may start him on his career.

Usually, the first connection that the prospective witness will make with his lawyer will be a talk in which the witness' qualifications are discussed. For this sort of thing, a dossier ought to be prepared by every chemist who expects to serve in this way: that is, a qualification sheet reciting his education, his experience, his present employment, his various past connections of one kind or another, his membership in this or that society, which may tend to impress the judge or jury with his facility in the technology under trial and to qualify him as an expert. These qualification sheets should be made out in advance, but they should stress that kind of experience which makes him best serve his lawyer in the trial. For example, if it is a nitrocellulose case, and he has been in a nitrocellulose works as chemist for three or four years, that should be stressed. That should be an important point. His other qualifications that are less directed to that particular case need not be so much emphasized.

In corresponding with his lawyer, preliminarily, the chemist should suggest the kind of service that he can give but be explicit only after due consideration. The lawyer will usually ask for an estimate. If the statement of the proposed services is clear, and its nature, extent and time definitely known, the estimate of the work can be given at once. It is well to state two propositions of varying extensiveness in cost.

There should be a preliminary fee for the investigation of the case—never a contingent fee and never a retainer. It is bad practice. The fee leaves freedom to finally accept or refuse the case.

You must visualize from the beginning both sides of the case. That is why I say talkers who can't listen never made good witnesses. Imagination and constructiveness must be able mentally to erect his opponent's case, and its technological strength. You will see as we go along why a chemist cannot take a retainer in advance. There must be a preliminary search before commitment. This may be doubtful in time or extent. Suggest a limited sum and then do your best even if it goes beyond that sum. You have at least kept your liberty. On your first case, extend yourself, but don't cheapen your rate by billing the extended time at the unextended price. If the work goes much beyond the preliminary estimate, take your licking. Donate it as bread upon the waters. If your preliminary work, or additional preliminary work found necessary and paid for, assures you you are on the right track, take the case, and not otherwise. Never take a retainer. Take a preliminary fee. For that fee you investigate to see if you are on the right side, if you can go ahead honestly in taking that case. If you can't, stay out. Meanwhile, you have been paid for your time and your investigation, and you are not caught in the trap of taking a retainer for a case that you can't honestly go

on with. Your adverse report may save your client much.

The expert hasn't the liberty of the lawyer. The lawyer may justly and conscientiously serve the wrong side. The scientist's silent but constant client is truth, who pays best in the long run and yields the intangible but most secure constituent of happiness—self-esteem. After all, the success of an expert witness depends on the number of his winnings, and he who picks the right side before he enters, increases his chances enormously, because if he himself is convinced he can help to convince others. Be sure, then, that you are on the right side—the chances of victory are much increased and honor is saved in defeat.

Much testimony needs no preliminary supporting laboratory work or preparation of exhibits—merely study and digestion of the adverse allegations and expression of opinion in court, based on experience or knowledge.

If a case is long in prepaartion, be sure you divide the payments up into orderly payments over small periods. The client doesn't look so much at the final price if he pays little bill after little bill, and he is more inclined to continue the work and you are more likely to get your pay. (Laughter)

Keep a record of the time spent by yourself and by your employees, with definite time sheets for everything done by every employé. Get in the habit, if a number of men are in your employ, of billing each employé's time and rate. Have the time and rate and work of each employe appear on the bill. It saves contests later, and also makes for a clear understanding and a better appreciation of the efforts you are expending. However, no matter how many assistants you have, remember that preparation for court, as professional work, is always personal. Everything must be your knowledge, if you are the witness. Assistants can be hands only and not heads. But the Court does not require observation of all assistants' work at all times—only at the critical periods. Court testimony about laboratory work must be founded on personal observation by the senses—this is the law of evidence—by the exercise of one's own senses, and not by the reports of others. It is for this reason that the expert who is to appear, must check and double check every observation, transfer, weighing and reading of a burette. Here the question of *hearsay* arises. It is not allowed as expert testimony of a witness in court. It is for this reason that the man, no matter what his fee is, must actually supervise the laboratory work and check all significant data. It is not the work of the hands that he must do, but wherever the head is required he must do the work.

The earnest chemist, anxious to serve in the witness-box, may often be faced with the problem of finding the best witness for his lawyer friend. If he is truly friendly with his lawyer, his mind should be on winning that case. This often may mean standing aside. A chemist, as an expert witness, should keep within his specialty, unless he has a large staff of varied capacity. "Science" is now a blanket name for unrelated specialties. Don't stretch the blanket. If it is the right thing to do, recommend another man. Remember that the reputation of an expert is built on winnings and victory comes not to the most guns but to the best aimed. The biggest gun is useless beyond its range.

Cooperation with the better specialist is often possible, if experimental work is needed. The more intense specialist prepares the material with you and acts as solicitor, and you act as barrister, or you may divide the case with a man who, you think, will be better in court. Frequently, the specialist may be weaker technically than you are, and yet it may be advisable, if he is more imposing, to use him. In that case, then, you act as his solicitor, and he is the barrister. The solicitor is the man in British practice who prepares the case, and the barrister is the man who appears in court. For example, the other side may have a university professor, the head of his department. It may be well to marshal against him another university professor of equal standing as a witness. In that case, you recommend that man if you think he is the better for that case, and you prepare the evidence of an experimental character with him. Where much work is to be done experimentally in advance, and the case is backed well financially, but little personal loss may be suffered in this sort of sacrifice. Your lawyer client may thus learn to lean on you as a fellow-marshaller of his forces in the battle, knowing that the technical man is often the best judge of his fellow technologist's field, his merits and limitations.

Remember that the more astute lawyers read the records of cases. Those are all published. They study cases, these records, in their field of practice. A well planned case, with the testimony of the expert on the stand, is there in black and white as the expert's record of good or bad service to his lawyer. Many cases come to the textile chemist in this way. Quite often the parties who have lost an earlier case by reason of his preparation and testimony require his services later, having learned his worth to their loss.

The very existence of the expert in some quarters is regarded as an evil. The chemist has not brought on this unfavorable impression. It has been largely induced by the physician. The character of testimony in the medical field has made the criticism of the expert extremely harsh in certain quarters. Let us listen to what Wigmore, the Moses of Evidence says. In his great five volume Bible, "In admiralty cases, where skilled assessors form part of the tribunal, special nautical witnesses are not allowed to be called. On the other hand, in patent practice, the expert witnesses, nominally so-called, are naturally the retained partisan assistants of counsel, and yet no movement of complaint is made against the method—the abuse is not felt.

"A professional man is not more biased or corrupt

than the ordinary lay witness. It is merely that his bias or pecuniary subserviency when it is discovered is in a more marked and unpleasant contrast with that ideal of impartiality and trustworthiness which is the natural associate with abstract scientific truth."

There may be many audiences before whom the textile witness appears. He may have a single person in the form of a judge. He may have a jury. He may testify before a referee board, a trade board, or, in treasury practice, before three judges at once. In certain associations he may sit before a Board of Appraisers. In patent cases, he may often appear before the Examiner as a witness, not in a court; simply for a hearing. He may testify in damage cases, import cases, give testimony of all sorts.

Bring demonstrations and experiments to court. Neat exhibits make a subtle contact with a jury that speech may not. The manner of a witness may often be helpful. In your direct examination, you should be brief, you should be sure, and that is the point in taking only the right case: You should be convinced, and if convinced, you will be convincing. You should be free and frank, and prompt in your admission of ignorance. But be sure it is on non-relevant matter. (Laughter) There is no disgrace in an occasional, "I don't know." It makes what you do know a conviction, and it counteracts the imputation of cock-sureness, which is a bad thing in court.

In the case of the jury, try to conciliate the most opinionated. That is a good rule. Size up that man who is hardest to convince and then appeal to him.

On cross examination by the adverse lawyer, the witness's best manner is an anxiety to serve (laughter), to tell the truth, of which you must be convinced. This anxiety to serve the cross-examining lawyer is calculated usually to make him feel bad. (Laughter) He is seldom grateful.

If it is a jury case, and you know the other expert, act exactly as if he were not an opponent. Be natural. Neither assume a cordiality you do not feel, nor a fictitious enmity. If he is there to lie—there are some weak brothers who do that (laughter)—shun him. But if he has an honestly divergent opinion, treat him as naturally as if you were both spectators. Sportsmanship appeals to judge and jury, but it has to be the real thing.

Prepare your own direct questions and answers after conference with your attorney. Thus guided, you can do better than he. He may have much more important matter to attend to. Many a case that looks strictly technological to the expert has been won, however, without calling him in at all. Advise with your lawyer beforehand.

Don't instruct your lawyer in the law. We have some experts that are likely to try that. Remember, you are only an ammunition maker and not a general. He has a better court-sense than you can ever hope to have, and he makes his living thereby—talking the same language as the judge—which the chemist will never learn. He has his own troubles. (Laughter)

In a patent case, for example, you may be serving the plaintiff and the defendant will cite prior patents and texts or publications upon which his defense will rely, pleading the lack of novelty in your patent, and your job is to investigate the effectiveness of the precisely cited disclosures. Yours it will be to show the inoperativeness of the alleged anticipations. This must be done by experiment. You must develop their lack of resemblance or relevancy to your patent, their vagueness, their incompleteness, their misleading or concealing character. Yours it is to show in them some vice that leaves them without worth or significance by fair laboratory tests and trials and exhibits. Here a knowledge of French or German is of use in reading or interpreting foreign originals of reference.

As defendant's expert, your task is to help gather for your lawyer all texts and periodicals, references, tending to invalidate the novelty of the adverse patent, on which the plaintiff relies. Yours it is to take the patents that you or your lawyer's research staff may have unearthed as containing antedating matter, and to show by testimony as an expert, by records of laboratory trials and resultant exhibits that these earlier publications do enable you to secure the results, manufacture the product, or simulate equivalently the patent in contest. Yours it is to help the lawyer develop convincingly such data as would have precluded the issuance of the patent if the Examiner had had them at hand, or interpreted them as you now do.

If, on the other hand, you are for the plaintiff and the defendant working under his own patent pleads its divergence from yours, then you may have the burden of demonstrating, by search, by test, by experience, by exhibits and by literature the equivalence of the imitator's, the defendant's process, to your own. His patent for a process may be a mere ruse. He may use your very process, with your very materials, and the product he makes may need the most searching and most original method of analysis to prove that your process has been used in its production.

Your infringer may also market your patented product, claiming a different composition. It is then the plaintiff chemist's job to show the identity or equivalence of the infringing article. All sorts of ruses may be employed to infringe. Stearic acid, for example, may be added in a dyeing formula, patented, and may be dodged by using dye in the form of a stearate—equivalent processes disguised as different. Equivalent products are claimed as divergently constituted or made. Frequently, the patentee's own licensees, chafing at the royalties they have to pay, may claim to have abandoned the patent, and by slight changes, or even the ruse of taking out another patent, seek to avoid their obligations.

The expert serves also by affidavit, tending to show

before issuance of a patent that it differs from prior matter, which the Examiner cites. He may serve as a witness in establishing by his technical knowledge that a trade-mark menaces the business of another before a patent Examiner. These hearings may be in New York, or they may be in Washington. He may serve in mixed questions, when, for example, trade-marks are alleged to be used as ruses for the extension of a patent. Sometimes confused cases like that exist.

Usually, the service in a patent case is about like this: You are sworn. You give your name, address, and occupation. Sometimes the whole thing stops right there for some legal question. You may find all your work abandoned, and the lawyer may be able to do without you, or the case may be settled out of court. However, if it goes further, having given your name and address, then you give your education, your degrees, your qualifying employment, your experience. If you are good, the lawyer on the other side usually quickly grants the qualifications. You start to recite how good you are, and he steps in right away and admits it. Your own lawyer, as a rule, won't allow that (laughter) because if there is a jury present he doesn't want that stopped. He wants to have it impressed with your long experience or special knowledge. The opposing lawyer lets your thin record come out. (Laughter) If you are a doctor, he invariably omits your title and then he donates it freely to everybody on his own side; all his witnesses from the factory garbage man up are called "doctor." (Laughter)

Under questions of your own lawyer, according to the testimony in your prepared questionnaire, you tell your story based on your experience, training, laboratory trials and illustrative exhibits of your work, every least thing in support of your case. You made full but original notes of everything you did, experimentally, and these must be ready to be explained in Court. Every weighing or observation should bear your personal check, whether you did the weighing or titration yourself or merely observed it. Every conclusive statement you make should be keyed in your questionnaire and to the record in the notebook. Every opinion based on results should be easily connected with the record itself. Any test you make should be shown to be standard and acceptable by textual references if demanded. Textbooks of an authoritative character should be at hand to back up your opinions. If you have reproduced patented directions—that is, the illustrative examples of a patented process—you must show exactly how you worked them as to quantities, materials, temperatures, time, required purity, and that you made reasonable trials of the range of variables indicated. If the patentee, for example, says, "I treated this from zero to twenty-five degrees," you should treat it not only at zero and at twenty-five degrees, but also in the middle somewhere, to show that you really tried to carry out the process. You must identify the samples furnished to you for analysis, and be ready to testify that they are the very same by your initials or some mark upon them. There is no use testifying about any article unless you know that it is keyed to the case. If the thing comes in an envelope, it won't do to have it marked on an envelope from an office. The article itself must bear an identifying label, or an initial, and as soon as you open that envelope, you must put your own initial on that article as having received it from a certain person at a certain time. There must be no break in the identifying chain of an article that is analyzed and submitted as a court exhibit.

Many times I have had clients come in and want me to analyze something and appear in court about it. Having asked them to identify the sample, or get me a sample that is identified, sometimes they don't come back. The sample they had placed in an envelope was not one that had anything to do with the case, but they would have liked to have somebody swear carelessly that that particular exhibit had such and such a character, hoping that the lawyer on the other side would make no inquiry. Lawyers are not that careless.

On cross-examination, you must be ready to reiterate convincingly to the Court your previous statements, and to justify the sources of your conclusions, your personal connection with every weight, measurement, sample and analysis, materials, or logical conclusion from the same.

In patent suits, as in all others, not only must the chemist in court assist his lawyer in his first or direct examination, but he may be called upon by either side repeatedly. More useful is he often in listening to the testimony of adverse witnesses and the opposing experts, and noting the weak, doubtful or contradictory technical matter, verbal or material, adduced, or the testimony that may be given unconsciously by the opponents which is favorable directly, or by inference, to his own side. This he notes. If the intervals of court sessions allow, he guides his lawyer in the cross examination of others to construct embarrassing, searching questions addressed to the opposition, based on their own evidence. If time does not allow a conference, he sits near his lawyer, listens carefully to the direct testimony of an opponent witness with a nimble ear and a scrutinizing eye, for all exhibits used by opponents to confirm their statements, and he writes in a legible hand a list of clearly stated, briefly phrased, well separated questions with important or key words stressed. He hands this to his lawyer at the time best suited and not so as to restrict the lawyer's other questions, which may be lengthy, or much more important. Usually the lawyer will give a signal when he is ready for his expert's questions.

He must also stand by for further service. The answers to his own lawyer's questions may elicit need for still more technical questions. An elusive witness on the other side may need technical questioning more and more categorical to drive him to an unfavorable admission.

The chemical expert may also serve his lawyer in as-

sisting in clearing up apparent contradictions by the witnesses on his own side. For example, one of your witnesses may say positively that oxidizing agents are needed, and another witness on your own side may say, "I found hypochlorites necessary." In a jury case, the average juryman might think that a contradiction. It may be up to you to clear the thing up in the judge's mind, or in the minds of the jurors, that hypochlorites are oxidants, and that no contradiction occurred.

One witness may say that he gets results at certain temperatures. Another may insist that he needed higher temperatures. But the concentration or time may be different. Thus, by paying attention, you may rid your own side of apparent contradictions. This is not so important in patent cases where the lawyer is a bit of a technologist, and the judge has a certain knowledge of chemistry, but jurors must be watched so that apparent contradictions on your own side are not so magnified as to disqualify your witnesses in their minds.

A well-staffed laboratory will help the witness, especially if he has men at his service who are not averse to overtime work suddenly demanded, and it is a strong factor in winning a case. It may frequently happen that unfavorable or suspicious technical testimony and exhibits are presented by the opposition. As soon as this develops, your own laboratory should be notified to prepare for tests, and after court, even if no one goes to bed that night, the opposition may be exploded or exposed as technically unsound. Remember that much technical evidence derives from a laboratory largely devoted to production rather than research and not used to speeding up research problems. Twelve hours, with a good staff, may upset months of work by the opposition routine plant chemists.

If an adversary is lying, you can often get the best of him by asking to examine his records. In more than one case the testimony has been shamefacedly withdrawn when this was asked for. In a case not long ago, after three days on the witness stand, an opposition witness was asked to show his notebook to the other side, and it wasn't long before it was found on examining it that it was so flagrantly different from his testimony that he asked the next day to have his whole three days' testimony withdrawn. It is not well in a case of this sort to insist on punishment for perjury. It would look too vindictive, and mercy is the best procedure and policy.

It is also well and convincing if the expert by his work can identify himself with factory practice as well as with laboratory practice. It is much more convincing, in a difficult case, to say, "I have dyed millions of yards by this process," than to talk of grams or a few inches of ribbon. (Laughter)

The kind of clients served by the expert witnesses are varied. He may simply be serving an individual in a small case, or he may have served the Government itself, the State Department, the Army, the Marine Corps, the Treasury Department, the War Trade Board, the Post Office Department, all of which have been served by yours truly, and I suppose a number of chemists in town have similarly served as many Government activities.

Corporations, as a rule, will form the bulk of the textile chemist's work in Court. In connection with trade associations the sittings before them are usually informal and are very pleasant. The cases usually take a short time, and there isn't much litigation. In fact, lawyers are not present. The case is decided by technological referees. The Silk Association was a case in point, where people who belonged to it agreed to take their cases to a referee board. Only one technological expert appeared against another technological expert. The case was all over in a very short interval, and it was judged by men expert in the article or trade.

The expert may also serve international expert groups, as we have had occasion to do. He may serve individuals in damage cases, or he may serve municipalities. They may be cases of cloth for uniforms, they may often be cases of damages from dye or textile factories, for example, which are sued by the town itself for nuisances, or explosions, or damages of any sort. He may also serve a department store. Department stores, however—with a few brilliant exceptions—are not inclined to spend much money on science. (Laughter) I hope the case may be improved. (Laughter)

The kinds of damage that sometimes come up may be the weakness of a thread, or uneven dyeing or bleaching, stains or discoloration, uneven spinning, spoilage by oil or water or by flying dyestuff, by fading, by improper bleaching, by nuisances in the mill, rain water or something of that sort, and from other sources such as from factories above, fire losses, fire damage, dye combustion. Hundreds of cases might be cited that might cause textile damage.

Gentlemen, I am glad to have had the opportunity of addressing you this evening. I am sorry I couldn't concentrate it a little more. (Applause)

DISCUSSION

Chairman Baxter: I am glad, Dr. Harold, that you didn't attempt to boil it down any further.

Listening to Dr. Harold reminded me of one of the few times that I have been in court. I guess I must have been bad. (Laughter) I was testifying as an expert on the dyeing of a certain fabric, and the opposition attorney didn't seem to recognize me as that at all. (Laughter) During the course of my time on the stand, the opposition attorney continued to read tremendously long articles from various textile publications, and suddenly, while he was reading one of these articles and interspersing questions to me in connection with them, a little fellow in the back of the jury box jumped up and waved his hand, some-

thing in the "Teacher" fashion. The old judge looked at him and said, "Sit down." And he did.

The attorney for the opposition, becoming very gracious, said, "Your Honor, we will be glad to waive our rights and allow the juror to ask any question that he wishes."

The judge looked at him and said, "Well, what do you want?"

The little fellow jumped up and said, "Your Honor, this man has got damages. Why don't he pay his bills?" (Laughter)

So they threw the case out of court because of a prejudiced jury. (Laughter)

I wonder if there are any of those present who have any questions, or who possibly are anticipating a visit to court and would like to ask Dr. Harold any questions at this time.

Mr. H. O. Chute: If you would allow a stranger to speak, I want to confess my pleasure in hearing Dr. Harold say that if you are going to be an independent technical expert, you always should get a fee for a preliminary examination. In the first place, it satisfies your pocketbook; second, your conscience, and third, it is going to satisfy the jury when it comes out that you would not take the case until you had had a chance to satisfy yourself, regardless of any monetary consideration, as to whether this was a desirable case to take and one that you thought you could win. That is very important, and frequently chemists are, as he says, tempted to take cases on a contingent fee. These lawyers don't know anything about chemistry, but they know a good deal about how to bring out facts. The first thing you know, it is brought out that you are testifying for the sake of getting a fee, and that pretty well throws you out of court.

Moreover, in any court case, whether it is a patent case or anything else, there is many a slip between the cup and the lip, and the two parties are liable to compromise and not get any decision, and you don't get any value for it.

Another thing that struck me there was his statement that you must make your evidence clear to the jury. Don't use big words, and don't think that you are put on the stand to tell how much you know about chemistry. You are put on the stand to explain to the judge, who doesn't know anything about the technology of the case, as a rule —or very little—but he does know a great deal of logic. He does know a lot about reading human character. From what you say, and how you have gathered your evidence—say your analytical work and so forth—he can very easily make up his mind as to what value to give to your evidence.

I don't want to take up any more time. Therefore, I will again express my admiration for the idea that you must start in by getting the fee beforehand. (Laughter)

Chairman Baxter: Your admiration, I am sure, is the same admiration that all of us have who know Dr. Harold and know the way he has helped out this Association and the New York Section particularly in everything that this Section has ever done. I for one appreciate his being with us tonight. I looked forward for a long time to hearing him, and I know he has lived up to the expectations of all of us.

Mr. P. J. Wood: Mr. Chairmain, I have one question I would like to ask Dr. Harold. I was very much amused at his description of the boy who was going to do some special work after hours at college to help out. It coincided somewhat with an experience I had when I was chemist in a textile works years ago. The owners wanted me to take some part in the management. They said they had a very good man to go into the laboratory because he had worked in a drug store. (Laughter) I later found he was a soda jerker. (Laughter)

The question I would like to ask Dr. Harold is what is his opinion of the jury as ordinarily drawn in deciding these extremely technical cases? I think the expert evidence goes right over the heads of most of them. I think they are more impressed by the manner and straightforwardness of the witness than they are by the subject matter of his replies. That has been my experience, at least, in the few times that I have been on the stand. I think most of them are somewhat in the position of a boy down in South Carolina. This is an experience that I had recently.

I had a finisher who was a German, and he and I, as practice for me, talked in German all the time. We were talking in the laboratory one day. This boy was standing close by. I didn't notice him. We had been talking entirely in German. The finisher went out of the room. The boy said, "I reckon I'd like to work here."

I said, "You had better make application in the office, and when your papers come down here, I can do with one or two more boys."

"If I work here will I have to work with that man that just went out?"

I said, "It is more than likely you would."

He said, "I reckon I never will learn to understand these here Northerners." (Laughter)

Don't you think some the juries are in that position?

Chairman Baxter: Do you want to answer that question about the juries?

Dr. Harold: I haven't had that hard experience that Mr. Wood thinks might happen. I usually find some men on the jury who seem to be following what I say. Perhaps fifteen years in the classroom have helped me a bit in presenting the thing in simple language. That, and perhaps nice exhibits help out with a jury. I haven't found that you can get anywhere with any jury if you start on the premise that none of them know anything about science. I usually assume that if I am sufficiently clear they will understand. I don't think I have met a case in which some of the jurors didn't seem to follow, no matter how technical it was.

Chairman Baxter: I thought someone might ask Dr. Harold about this matter of flying dyestuff that he mentioned, as to who makes it. I was making some tests this afternoon. I think the materials I was testing were dyed with it. It flew right off, practically, in cold water. (Laughter)

ONE HUNDRED AND SIXTH MEETING OF THE RESEARCH COMMITTEE

THE one hundred and sixth meeting of the Research Committee followed the Council meeting in New York on June 11th, 1937. Present were Chairman Louis A. Olney presiding, K. H. Barnard, E. C. Bertolet, J. R. Bonnar, W. H. Cady, H. D. Clayton, C. Z. Draves, Alban Eavenson, Ephraim Freedman, J. F. X. Harold, Ralph Hart, H. F. Lawton, Hans Meyer, W. R. Moorhouse, G. A. Moran, R. M. Ritter, R. E. Rose, H. D. Smith, Ben Verity, P. J. Wood, and H. C. Chapin, Secretary.

It was announced that the Textile Foundation had granted its financial support to the research program approved at the one hundred and fifth meeting of the Research Committee. It was announced that hereafter, for convenience in filing, results of research under the direction of the Association would be concentrated in special quarterly issues of the AMERICAN DYESTUFF REPORTER. The Chairman requested that reports for the Year Book be delivered to him within two weeks. The Chairman reported on the National Rayon Conference in Washington attended by Mr. Hathorne and himself, and on the Rayon Research in cooperation with the Throwsters' Research Institute.

Mr. Eavenson reported for his committee directing Dr. Harris' researches on Chemistry of Wool Fiber. Mr. Cady reported on the Printing Paste research, stating that Dr. L. F. Gleysteen was succeeding Dr. Glarum, who had resigned to accept another position. The Chairman reported on Mr. Ryberg's investigation of extraneous matter in wool. The Chairman and Dr. Meyer reported on Crock-Meter standards and recent work of Mr. Durfee, describing plans to publish a standard gray crock mark, and to give it a Munsell color rating.

A committee was appointed, consisting of Ephraim Freedman, Chairman, Dr. Meyer, and a manufacturers' representative to be chosen by Mr. Freedman, to consider standards of wet color transfer on bathing suits, etc., and color change and transfer in hot pressing. Dr. Harold deWitt Smith discussed plans of his committee for research on the fundamental chemistry of cellulose. Mr. Cady discussed progress of compromise with British and German associations on light fastness standards. Mr. Hart stated that the committee on Sulfonated Oils was preparing a report on Unsaponifiables. Mr. Barnard stated that a paper on Creaseproofing Standards would be published in October.

Respectfully submitted,

H. C. CHAPIN, *Secretary*.

ONE HUNDRED AND THIRTEENTH COUNCIL MEETING

THE Council held its 113th meeting at the Chemists Club of New York, on Friday morning, June 11, 1937. Present were President William H. Cady, presiding; Elmer Bertolet and Alban Eavenson, Vice Presidents; William R. Moorhouse, Treasurer; Louis A. Olney, Chairman of the Research Committee; Robert E. Rose and P. J. Wood, Past Presidents; Carl Z. Draves, Councilor-at Large; Ben Verity, Hans Meyer, and R. M. Ritter, representing Rhode Island, Philadelphia, and New York, respectively; and Harold C. Chapin, Secretary. The Secretary's report of the 112th Council meeting, the Treasurer's report of June 10, and the Secretary's balance sheet attached hereto, were accepted.

It was voted that the next Annual Meeting program be printed for distribution at the meeting, but not for mailing in that form to members. The offer of the Howes Publishing Co. to print a program number of the American Dyestuff Reporter, and from the same type a separate program for distribution at the meeting, was accepted. Ephraim Freedman was appointed to represent the Association on the Apparel and Accessories Committee of the New York World's Fair of 1939. It was voted that a Council meeting be held in Philadelphia at 2 P.M. on Friday, Dec. 3; and tentatively, that the first meeting of the fall be in Boston, on Friday, October 1. Mr. Moorhouse presented a report from the Committee on Revision of the Constitution.

Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided no objection be received meanwhile by the Secretary.

Active

I. J. Akers	R. S. Ireland	L. J. McGinty
C. B. Burns	C. T. Kirby, Jr.	J. J. Nesterowicz
H. M. Clark	G. H. Klingberg	Joe A. Okey
G. R. Currier	P. A. Koch	Albert Reinhold
T. A. Davis	F. F. Kraft	E. A. Richards
R. W. Diehl	O. R. Krasley	J. A. Robertson
Herbert Eastwood	Abraham Lifland	R. J. Schuster
W. M. Girodet	A. T. Lomax	G. F. Shoemaker
A. M. Gordon	Pauline Beery Mack	Norman Snyder
Winfred Haimerl	Neale MacNeill Jr.	J. C. Steele
Ernest Hardwick	Dorman McBurney	E. A. Stienen
J. P. Harrison		Paul Weise

Junior

James Craig, Jr.	Robert Kenyon	J. H. Orr
P. P. Dubiel	A. F. McLean	E. E. Rettberg Jr.
Alfred Harrison 2nd	W. K. Newman	E. J. Smith

Associate

D. B. Bell	J. S. Morrison	F. H. Ross
J. A. Bryant Jr.	E. D. Murphy	H. J. Smith
R. I. Harris	W. C. Osgood	E. E. Yake
J. J. Deegan	E. G. Parker	

Secretary's Balance Sheet—June 10, 1937

	Applications	*Dues regular and reinstate.*	*Dues Corp. and Sustain.*	*Miscellaneous*	*Bank charges*	*Totals*
Received by Secretary, Nov. 1, 1936 to Apr. 14, 1937	$1,190.00	$7,685.45	$2,115.00	$1,319.29	—3.92	$12,305.82
Received by Secretary, Apr. 14, to June 10, 1937	265.03	175.00	258.00	287.81*	— .50	985.34
Total received	1,455.03	7,860.45	2,373.00	1,607.10	—4.42	13,291.16
Transmitted to Treasurer	1,320.03	7,830.45	2,365.00	1,587.15		13,102.63
Leaving to order of Secretary	135.00	30.00	8.00	19.95	—4.42	188.53

Miscellaneous items*		Crock-Meter Cloth	5.00
Year Books	$249.61	Carbonizing Report	.50
Analytical Methods	11.40		
Dyestuff Reporters	21.30	Total	$287.81

Student

L. A. Fluck Jr. J. H. Mahoney J. A. McCrossan Jr.
Clinton Grossman

Respectfully submitted,

H. C. CHAPIN,
Secretary.

OUTING, NEW YORK SECTION

THE Annual Outing of the New York Section was held on Friday, June 11th, 1937, at the North Jersey Country Club in Paterson, N. J. Although the day started in a threatening manner, it cleared off around 10:30 and, as the day wore on, became ideal for golf and other outdoor sports.

There was a total attendance of about 200 including members and guests. About 87 took part in the golf tournament and the remainder enjoyed tennis, horseshoe pitching, acquaintance renewing or other diversions. The results of the golf tournament were as follows:

Members:—low gross winners—P. A. Dunkel, J. D. Huizing and R. W. Wilson; low net winners—L. S. Dogin, R. H. Gaede, Tom O'Brien and J. Pattman; kickers' prizes were awarded to C. L. Kloss, D. C. Clarenbach, P. J. Kennedy and P. Moran.

By scoring an 89 with a handicap of 26 for a net of 63, L. S. Dogin has the privilege of retaining possession of the low net cup for one year. This cup will be awarded permanently to the first one to win it three times.

Guests:—low gross winners—B. Caskey, C. Irwin, R. Brewer and P. Doremus; low net winners—R. L. Jones, R. McCulloch, A. J. Wixson, J. R. Eldridge, P. Rettich and A. Born; kickers' prizes were awarded to G. Rosendale, S. M. Conn, L. Harlow and S. Sabriskie.

A feature of the golf tournament was a hole in one scored by Charles Bonura, a guest at the outing. A special prize was awarded to Mr. Bonura for his unusual feat.

The tennis tournament was won by Herman Baumann and honors for horseshoe pitching went to Harry Spatz. The festivities were concluded by a banquet in the evening during which various entertainment features were presented.

It was the opinion of all that this was one of the most successful outings ever held by the New York Section. The success was due to the untiring efforts of the committee whose members were as follows: A. J. Royce, chairman, G. L. Baxter, H. F. Herrmann, Ephraim Freedman, P. J. Kennedy and Paul A. Dunkel. The golf tournament was arranged by Paul Dunkel, tennis was under the direction of Roland Williams and horseshoe pitching was conducted by Robert F. Holoch.

Respectfully submitted,

P. J. KENNEDY,
Secretary.

Annual Outing, N. Y. Sec., June 11, 1937

UNEMPLOYMENT REGISTER

Members of this association, who are without employment, should forward to the secretary a statement as to their qualifications and experience. This information will subsequently appear on these pages with an identifying key number. Employers are also requested to file with the secretary or the American Dyestuff Reporter any vacancies which may occur in their businesses.—H. C. Chapin, Secretary, Lowell Textile Institute, Lowell, Mass.

Key: A—Laboratory and research; B—Dyeing or printing; C—Finishing; D—Sales; E—Instruction; F—Executive.

NOTE: PERSONS WHO HAVE OBTAINED EMPLOYMENT SHOULD NOTIFY THE SECRETARY OR THE AMERICAN DYESTUFF REPORTER AT ONCE.

Prospective employers may file vacancies either with the secretary or the American Dyestuff Reporter.

A-1

Education—B.T.C., Lowell Textile Institute.

Experience—Two years as chief chemist in cotton mill. Experienced on direct, vats, naphthols, sulfur, basic and developed colors. Two years' experience in protein, fat fiber and mineral control in grains and animal feedstuffs. Age 28.

A-B-1

Education—Graduate chemist and colorist from a leading textile institute. Speaks French fluently. High standing at school. Awarded 1st prize in chemistry. Member of honor society.

Experience—Knowledge of most processes of textile manufacturing and some experience in woolen and worsted piece and stock dyeing and color matching. Presently employed in other department but wishes to get into laboratory or dyehouse.

A-B-5

Education—Graduate of the University of Lausanne, Switzerland. Doctor's degree in Chemistry. Knowledge of French and German.

Experience—Eleven years with large bleaching, dyeing, printing and finishing plant as assistant Chemist and then Chemist in charge of the Laboratory. Experience in dyeing and printing cotton and rayon fabrics; research and analytical work. Woman.

A-B-7

Education—Evening school in textile dyeing and chemistry.

Experience—Dyehouse laboratory for 2 years. Foreman dyer and finisher on hosiery for 9 years. Experience on ribbons also vat dyes on rayon and silk skeins. 2 years assistant to superintendent. Desires position either in demonstrating and sales or dyer. Age 31; married.

A-B-C-2

Education—Graduate of Lewis Institute of Engineering of Chicago and graduate of Philadelphia Textile School (Chemistry and Dyeing department).

Experience—Has had extensive experience as assistant chemist and colorist in silk printing, dyeing and finishing; also dyeing raw stock wool; and dyeing and finishing cotton and rayon. Age 30; married; references.

A-B-C-3

Education—Graduate, Chemistry and Dyeing Course, Lowell Textile Institute, 1934.

Experience—Has experience as chemist; dyer of union knit goods (cotton and woolen); experienced bleacher on both. Has handled Tube-Tex processing on cotton and rayons. Single; will go anywhere.

A-B-C-D-1

Education—B.S. in Chemistry, Massachusetts Institute of Technology.

Experience—Combination of plant and laboratory work pertaining to bleaching, dyeing, printing, finishing of cotton, wool, artificial silk. Familiar with wool scouring; sizing of cotton, wool, rayon warps; analytical work; some experience in the manufacture of soaps, finishing compounds and wetting agents; technical service and sales work; paper mill experience; age 44; married; two children.

B-3

Experience—Foreman piece dyer for the past 21 years. Can dye the following: celanese, rayon, cotton backs, wool, silk and mixed fabrics. Has knowledge of finishing and laboratory work.

B-4

Experience—Foreman dyer in charge of ribbon dyeing for 20 years. Experienced on silk, cotton, rayon, acetate yarn. Age 41; will go anywhere.

B-5

Education—High School and Textile School Graduate.

Experience—Twelve years overseer of dyeing on directs, vats, naphthols, sulfur, basic and developed colors. Also experienced bleacher. Age 40; married; references.

B-F-1

Experience—As executive had charge of the dyeing of ribbons and piece goods for 6 years; spun silk yarn, fast and resisted dyeing for 8 years; hosiery for 12 years. Has been quite successful in all three of these mills. Age 50 married. Will go anywhere.

F-1

Education—Graduate of School of Textiles, Saxony (1925). Graduate of School of Commerce of University of Berlin (1928).

Experience—Worked in various departments of textile mills as worker, later as a supervisor. Familiar with the production, calculation and management of manufacturing. Thirty years old; unmarried.

AMERICAN
DYESTUFF
REPORTER

A. P. HOWES
Publisher

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MYRON DREW REESER
Advertising Manager

Published biweekly by
HOWES PUBLISHING CO., INC.
440 Fourth Avenue, New York City

Subscription price: $5.00 per year. Canadian, $6.00; foreign, $6.00

Vol. 26 August 23, 1937 No. 17

WASHINGTON NEWS LETTER

WALDON FAWCETT

AN eleventh-hour change of Congressional plans has affected the status of a number of legislative proposals in which the dyestuffs community is more or less interested. Instead of a prolongation of the session into September, if need be, to complete the "must" program, the majority organization swung to the substitute of adjournment in August, with the possibility of reassemblage in extra session, if need be, in October. The consequence is the postponement of action upon certain bills which might have slipped to vote, between major issues, if the calendar had run its length. Even so there are the doubts that arise of knowledge that the national administration would prefer to defer most of the independent offerings of business legislation, pending determination of the scope and character of the successor to NRA, if such a code clearing house is to be established.

FABRIC IDENTIFICATION

In its tentative form, fabric identification, is a new issue at Washington. Even so a bystander is struck by its conformation to a legislative trend of the period, viz., the disposition to submit every proposal in several alternative forms. This same diffusion persists in other quarters close to industrial interest. Notably the Food, Drug and Cosmetic Bill, Fair Trade legislation, so called, and the perennial quest for protection of original design. It would be rash to flatly assert that the policy has caused specific legislative enterprises to fall between two stools. Certainly it has the effect of delaying conclusive action both in committee and in the chamber. In contrast to the fashion of other days whereby business or scientific interests sought to compose their differences in private and present a united front in support of a coalition Bill.

On the count of fabric identification the situation may be least serious because choice is between only two expressions of the principle involved. The one is H. R. 6917, a Bill by Mr. Martin of Colorado, to protect producers, manufacturers and consumers from the unrevealed presence of substitutes and mixtures in woven or knitted fabrics. The other is H. R. 5182, the Bill by Mr. Peyser to require informative labeling of textile fabrics and textile products for the purpose of preventing deception of the public. With reference to the basic objective of compulsory disclosure of fabric content the two Bills may not be far apart. But involved in the ways-and-means phase of the parallel proposals is a political element that has passed unnoticed by too many textile interests.

The Peyser Bill vests most of the powers incident to the new censorship in the National Bureau of Standards of the U. S. Department of Commerce. The Standards Bureau is to make the rules and regulations concerning the labeling, stamping or tagging of fabrics. And is to classify textile fabrics. Enforcement is left to the Federal Trade Commission. But it would rest with the Standards Bureau to veto the use of the names of certain kinds of fiber, thread or yarn unless a labeled fabric contained prescribed amounts of percentages of such fiber, threads, and yarns.

By this cleavage on jurisdiction, the fabric identification project is plumped squarely into the midst of the most feverish conflict over bureaucratic control known to Washington. Raging on several fronts is a determined campaign to make the Federal Trade Commission the sole censor and arbiter of business conduct. It is dissent from this absolutism, more than anything else, which has impeded the progress of a new Food, Drug and Cosmetic statute. Now the same stumbling block is placed, possibly in all innocence, in the path of the fabric identification ambition. If any reader is not convinced that this Federal family quarrel is in deadly earnest he has but to run over the roster of the Bills pending in the two houses of Congress designed to give more power to the Federal Trade Commission.

MORE POWER TO THE TRADE COMMISSION

Outstanding among the pending Bills to extend the range of the police powers of the Federal Trade Commission are the Lea Bills (H. R. 3143 and H. R. 5854). The first-mentioned, which was recently the subject of hearings before the Committee on Interstate and Foreign Commerce of the House of Representatives, has encountered the opposition of organizations such as the National Association of Manufacturers and the Chamber of Commerce of the United States. The purpose, akin to that of the Wheeler-Rayburn Bill in the last Congress, is to give the Trade Commission authority to call a halt upon deceptive or unfair practices in trade even though the offender has no competitor but enjoys a monopoly in his field. As the law now stands the Trade Commission has no right to interfere with practices which do not occur in competition.

Senators Nye of North Dakota and King of Utah have, this year sought to amend, by S. 414, the Federal Trade Commission Act and Senator Nye is responsible for S.

363 relative to the reasonable regulation of competition. The Senate has already passed the Wheeler Bill (S. 1077) which amends the Act creating the Trade Commission. Senator Wheeler has another Bill (S. 1581) to prevent unnecessary and wasteful cross-hauling of commodities. Meanwhile, in S. 2640, Senator Walsh of Massachusetts would supplement the powers of the Trade Commission, particularly in respect to planning in industry by means of controlled cooperation.

The antagonism which has arisen in respect to the effort to add to the functions and extend the jurisdiction of the Trade Commission springs mainly from a fear of the consequences of the broad language of the enlarging amendments. Critical objectors declare that the contemplated addition to existing law would be comparable to an administrative blank check and would enable the Trade Commission to fashion and enforce its own definitions of what actually constitutes unfair and deceptive acts and practices. For all the exceptions taken to the specific proposal that has been the subject of discussions, the immediate issue has made the forces of business increasingly aware of growing sentiment in various quarters in behalf of a thorough-going reexamination of the substantive principles and administrative problems inherent in the Antitrust Laws in their present form.

DESIGN PROTECTIVE DEVELOPMENTS

In further evidence of the numerous ramifications at Washington of the question of Federal Trade Commission dominance in the entire regulatory and censorious scene behold the later developments in the situation dealing with the protection against piracy of original designs in industry. Further developments of particular interest have occurred in respect to the vindication of the systems of mutual insurance of designs, via cooperative registration, mentioned in the AMERICAN DYESTUFF REPORTER, issue of July 12.

As our readers have been informed, the Federal Trade Commission has undertaken to halt with a Cease and Desist Order the design protective system devised by the Millinery Quality Guild, Inc. Meanwhile the Commission left, in inconclusive state, its earlier-instituted action on the same general count against the Fashion Originators Guild of America and the National Federation of Textiles.

Two-fold fresh developments involve recourse by design-defenders to the higher U. S. Court. And seem, by implication, to indicate that the design-dependent industries are precipitating what may well prove a crucial contest for jurisdiction as between the Trade Commission and the courts. A contest, that is to say, which joins the issue from scratch instead of by the roundabout route of appeal from the mandates of the Trade Commission. Tied up with this duel for control of design regulatory agencies, and of especial interest to the textile community, is the incidental question of the bearing of monopoly upon collective design control.

While the Millinery Guild was perfecting its appeal from the Federal Trade Commission to the U. S. Circuit Court of Appeals, the Fashion Originators Guild and its textile annex were advancing on another front. While the Trade Commission has (for suspected reasons) marked time in the prosecution of its Complaint against the Fashion Originators Guild the issue has gone direct to the Courts in two versions. Viz. the case of Wm. Filene's Sons Company versus the Guild and the parallel but not duplicate case of Matilda Wolfenstein against the same organization. Disposition of the Wolfenstein case in the Appellate Division of the Supreme Court of New York was not felt to be epoch-making. And the victory of the Guild in the Filene case in the U. S. District Court for the District of Massachusetts was, obviously, not the last word on that dispute.

Latterly, finis has presumably been written on the Filene episode by the decision in favor of the Guild in the U. S. Circuit Court of Appeals for the First Circuit. The reviewing court seemingly gave a clean bill of health to the basic idea of joint action for design protection. In so many words the Appeals Court said that the Sherman Act does not preclude the members of an industry, in which evils exist disorganizing trade in such industry, from acting collectively in the elimination of such evils and establishing fair competitive practices. Incidentally the Court drew a distinction between the terms "style" and "design" which will stand as judicial confirmation of the understanding in the textile industry.

MONOPOLY MAKES COMPLICATIONS

No sooner was the Appeals Court pronouncement made known than followers of the crusade for design security began a close study of the distinctions or differences as between the Millinery Guild and Fashion Guild models of design defense. Because the Court, in sustaining the position of the latter, acknowledged that its attention had been called to the coincident action of the Federal Trade Commission outlawing the pattern of design protection employed by the millinery group. However, Judge Wilson in his opinion found the facts in the case at bar quite different from the facts found by the Trade Commission in the alternative case.

Presence of the monopolistic element in one design protective formula and not in the other was, mainly, the cleavage that was declared to separate the two expedients for the conservation of exclusive designs. The Court observed that in the Millinery Guild proceeding the Trade Commission found that the Guild membership formed a substantial majority of the originators of leading high-grade designs. In the textile set-up the facts were otherwise. Thus it was a presumption that in the one case competition was hindered whereas in the other case it was not. Unless and until the Federal Trade Commission edict against the Millinery Guild is reversed in the Federal Circuit Court of Appeals, all would-be protectors of designs and color plans may be impelled to study most carefully the differences between the two systems of private or cooperative registration and control of designs.

Mildewproofing Khaki

(Continued from page 500)

TABLE 3

Effect of Artificially Induced Mildew Upon the Tensile Strength of Copper-Treated 8-Ounce U. S. Standard Army Duck Before and After Exposure to the Weather for Six Months.

Sample No.	Treatment applied: Impregnated with cupric acetate solution Grams per 100 cc water	Treatment applied: After-treated with sodium carbonate solution Cold or hot	Condition of portion tested as regards exposure to weather	Effect of mildew on strength: 1-inch strips, warp yarns: Sterile controls Kg.	Effect of mildew on strength: 1-inch strips, warp yarns: Inoculated with Chaetomium globosum and incubated Kg.	Variation in strength of inoculated and incubated from that of sterile controls Per cent	Copper present on basis of final weight of fabric, moisture-free Per cent	Loss in strength from exposure to weather Per cent
Untreated controls			Unexposed	55.5	7.5	—86.4	0.00	
			Exposed	29.9	16.8	—43.8	0.00	46.1
10-1*	7.0	Cold	Unexposed	57.4	59.1	+ 3.0	2.14	
			Exposed	16.2	15.9	— 1.9	0.15	70.4
10-2*	do.	Hot	Unexposed	60.8	58.3	— 4.1	2.90	
			Exposed	31.4	30.1	— 4.1	1.17	48.4
10-3	do.	Cold	Unexposed	57.5	60.8	+ 5.7	1.67	
			Exposed	15.4	15.5	+ 0.6	0.11	73.2
10-4	do.	Hot	Unexposed	56.5	59.0	+ 4.4	1.62	
			Exposed	20.3	20.0	— 1.5	0.12	64.1
11-1	5.0	Cold	Unexposed	54.5	56.2	+ 3.1	1.29	
			Exposed	17.4	10.6	—39.1	0.02	68.1
11-2	do.	Hot	Unexposed	55.9	57.0	+ 2.0	1.23	
			Exposed	19.4	11.0	—43.3	0.02	65.3
12-1	3.5	Cold	Unexposed	57.9	58.6	+ 1.2	0.98	
			Exposed	21.4	12.8	—40.2	0.00	63.0
12-2	do.	Hot	Unexposed	56.4	56.1	— 0.5	0.96	
			Exposed	21.2	13.2	—37.7	0.00	62.4
13-1	1.75	Cold	Unexposed	56.4	59.0	+ 4.6	0.62	
			Exposed	22.4	12.9	—42.4	0.00	60.3
13-2	do.	Hot	Unexposed	56.8	58.2	+ 2.5	0.56	
			Exposed	24.3	15.1	—37.9	0.00	57.2
14-1	1.0	Cold	Unexposed	54.3	53.9	— 0.7	0.37	
			Exposed	26.9	16.7	—37.9	0.00	50.5
14-2	do.	Hot	Unexposed	52.4	52.6	+ 0.4	0.32	
			Exposed	27.0	14.7	—45.6	0.00	48.5
15-1	0.5	Cold	Unexposed	56.7	56.0	— 1.2	0.22	
			Exposed	29.7	16.6	—44.1	0.00	47.6
15-2	do.	Hot	Unexposed	53.8	53.8	0.0	0.19	
			Exposed	32.0	18.0	—43.8	0.00	40.5

*Samples 10-1 and 10-2 were given a double treatment, i.e., after being treated once with the cupric acetate, followed by sodium carbonate, they were treated again in the same way.

acetate, originally from 1.29 per cent (No. 11-1) to 0.19 per cent, (No. 15-2) was reduced to 0.02 and 0.00 per cent upon weathering for the same period. The exposed portions of these samples showed pronounced mildew growth and loss in strength upon inoculation and incubation.

In Table 4 it will be observed that the copper content of the unexposed portions of the treated samples ranged from 0.09 per cent (No. 23) to 2.18 per cent (No. 19-1). In general, the results of the mildew resistance tests on these samples agreed with those obtained on samples treated with copper alone (Table 3). The unexposed portion of sample No. 23, containing only 0.09 per cent of copper, showed slight mildew growth and only 21.5 per cent loss in strength after inoculation and incubation, compared with 86.4 per cent loss for the exposed untreated control and 80.6 per cent loss for a sample subjected to the same treatment without copper (No. 7, Table 2). The unexposed portion of sample No. 26-1, containing 0.11 per cent of copper, showed no loss in strength after inoculation and incubation, compared with 92.8 per cent loss for a sample subjected to the same treatment without copper (No. 8-1, Table 2).

After weathering, the copper content of sample No. 20 (originally 1.32 per cent) was only 0.11 per cent, but the exposed portion was mildew resistant. The exposed portion of sample No. 25-1, which had an original copper content of 0.36 per cent, contained only 0.04 per cent cop-

TABLE 4

Effect of Artificially Induced Mildew Upon the Tensile Strength of Copper-Containing Mineral Dyed and After Exposure to the Weather for 6 Months

Sample No.	Treatment applied: Impregnated with: Chromium-potassium Sulfate (chrome alum) solution, sp. gr. 1.146 Per cent vol.	Chromic acetate solution sp. gr. 1.162 Per cent vol.	Ferric sulfate solution sp. gr. 1.450 Per cent vol.	Pyrolignite of iron solution sp. gr. 1.070 Per cent vol.	Water Per cent vol.	Cupric acetate* Grams per 100 cc of liquid	Steamed	After-treated with sodium carbonate solution Cold or hot	Condition of portion tested as regards exposure to weather
Untreated control					100				Unexposed Exposed
16			33		67	5.0	No	Cold	Unexposed Exposed
17-1				50	50	10.0	Yes	Cold	Unexposed Exposed
17-2				50	50	10.0	No	Cold	Unexposed Exposed
17-3				50	50	10.0	Yes	Hot	Unexposed Exposed
17-4				50	50	10.0	No	Hot	Unexposed Exposed
18-1				50	50	1.0	Yes	Cold	Unexposed Exposed
18-2				50	50	1.0	No	Cold	Unexposed Exposed
18-3				50	50	1.0	Yes	Hot	Unexposed Exposed
18-4				50	50	1.0	No	Hot	Unexposed Exposed
19-1		12.5		50	37.5	10.0	Yes	Hot	Unexposed Exposed
19-2		12.5		50	37.5	10.0	No	Hot	Unexposed Exposed
20		12.5		50	37.5	5.0	Yes	Hot	Unexposed Exposed
21		12.5		50	37.5	2.5	Yes	Hot	Unexposed Exposed
22		12.5		50	37.5	1.0	Yes	Hot	Unexposed Exposed
23		12.5		50	37.5	0.5	Yes	Hot	Unexposed Exposed
24-1	18.75		10.0	15.0	56.25	10.0	No	Cold	Unexposed Exposed
24-2	18.75		10.0	15.0	56.25	10.0	No	Hot	Unexposed Exposed
25-1	18.75		10.0	15.0	56.25	5.0	No	Cold	Unexposed Exposed
25-2	18.75		10.0	15.0	56.25	5.0	No	Hot	Unexposed Exposed
26-1	18.75		10.0	15.0	56.25	2.5	No	Cold	Unexposed Exposed
26-2	18.75		10.0	15.0	56.25	2.5	No	Hot	Unexposed Exposed
27	8-ounce U. S. Standard Army duck, mineral dyed with chromium and iron by a commercial dyer (see Sample No. 9, Table 2), and then after-treated in this laboratory with a 7 per cent cupric acetate solution, followed by hot sodium carbonate solution.								Unexposed Exposed

*The dry cupric acetate was dissolved in the iron, or iron and chromium solution, in the proportion indicated.

per and lost 37.0 per cent in strength after inoculation and incubation, compared to 43.8 per cent for the exposed untreated control.

Sample No. 27, which was commercial mineral dyed khaki duck subjected to a copper treatment in the laboratory, contained 1.23 per cent of copper before exposure and 0.09 per cent after exposure. The unexposed portion was mildew proof but the exposed portion, after inoculation and incubation, showed slight mildew growth and 23.7 per cent loss in strength, compared with 77.2

-Ounce U. S. Standard Army Duck Before

Effect of mildew on strength				
1-inch strips warp yarns				
Sterile ontrols	Inoculated with Chaetomium globosum and incubated	Variation in strength of inoculated and incubated from that of sterile controls	Copper present on basis of final weight of fabric, moisture-free	Loss in Strength from exposure to weather Per cent
Kg.	Kg.	Per cent	Per cent	
55.5	7.5	—86.4	0.00	
29.9	16.8	—43.8	0.00	46.1
59.2	57.2	— 3.4	0.95	
25.9	13.8	—46.7	0.06	56.3
54.2	54.8	+ 1.1	1.78	
10.2	10.7	+ 4.9	0.15	81.2
55.8	55.6	— 0.4	1.76	
13.7	13.3	— 2.9	0.14	75.4
55.5	55.2	— 0.5	2.12	
13.3	13.1	— 1.5	0.13	76.0
52.8	53.3	+ 0.9	2.10	
12.9	13.1	+ 1.6	0.14	75.6
51.4	51.7	+ 0.6	0.30	
9.5	4.9	—48.4	0.00	81.5
51.5	52.5	+ 1.9	0.26	
10.3	4.8	—53.4	0.00	80.0
53.2	52.2	— 1.9	0.18	
9.1	4.5	—50.5	0.00	82.9
52.1	52.9	+ 1.5	0.21	
9.5	5.9	—37.9	0.00	81.8
52.7	52.6	— 0.2	2.18	
26.5	27.2	+ 2.6	0.55	49.7
55.9	55.8	— 0.2	1.96	
33.1	33.1	0.0	0.42	40.8
52.0	54.1	+ 4.0	1.32	
22.5	22.2	— 1.3	0.11	56.7
52.8	53.3	+ 0.9	0.57	
21.2	14.8	—30.2	0.04	59.8
51.1	50.3	— 1.6	0.11	
18.3	11.4	—37.7	0.00	64.2
52.2	41.0	—21.5	0.09	
18.7	9.0	—51.9	0.00	64.2
60.6	59.8	— 1.3	1.37	
29.8	31.2	+ 4.7	0.20	50.8
62.0	59.8	— 3.5	1.34	
32.2	31.4	— 2.5	0.22	48.1
59.2	58.4	— 1.4	0.36	
29.7	18.7	—37.0	0.04	49.8
57.7	59.1	+ 2.4	0.49	
30.3	20.8	—31.4	0.03	47.5
57.7	55.4	— 4.0	0.11	
29.8	17.8	—40.3	0.02	48.4
58.6	57.8	— 1.4	0.13	
31.8	14.5	—54.4	0.01	45.7
47.4	47.8	+ 0.8	1.23	
27.8	21.2	—23.7	0.09	41.4

TABLE 5

Effect of Artificially Induced Mildew Upon the Tensile Strength of Copper-Free and Copper-Containing Waterproofed Gray 8-Ounce U. S. Standard Army Duck Before and After Exposure to the Weather for 6 Months.

Sample No.	Treatment Applied			Condition of portion tested as regards exposure to weather	Effect of mildew on strength: 1-inch strips, warp yarns — Sterile controls Kg.	Inoculated with Chaetomium globosum and incubated Kg.	Variation in strength of inoculated and incubated from that of sterile controls Per cent	Copper present on basis of final weight of fabric, moisture-free Per cent	Loss in strength from exposure to weather Per cent
Untreated controls				{Unexposed	55.5	7.5	—86.4	0.00	
				{Exposed	29.9	16.8	—43.8	0.00	46.1
28	Petrolatum (vaseline), yellow, U.S.P.	pounds	1.7	{Unexposed	54.4	15.4	—71.7	....	
	Beeswax, yellow, refined	pounds	0.3	{Exposed	13.5	10.7	—20.7	....	75.2
	Volatile mineral spirits	gal.	1.0						
	Brushed one coat on each side.								
29	Petrolatum (vaseline), yellow, U.S.P.	pounds	1.7						
	Beeswax, yellow, refined	pounds	0.3						
	Raw sienna, dry	pounds	1.0	{Unexposed	56.9	13.2	—76.8	....	
	Volatile mineral spirits	gal.	1.0	{Exposed	44.1	21.0	—52.4	....	22.5
	Brushed one coat on each side.								
30	Same as No. 28 except one pound of basic copper carbonate, technical, was added to the waterproofing solution. Brushed one coat on each side.			{Unexposed	54.0	55.7	+ 3.1	10.09	
				{Exposed	36.9	37.2	+ 0.8	8.99	31.7
31	After wetting-out and squeezing, impregnated with 5 per cent cupric acetate solution, squeezed and air dried for two hours. Then treated with cold sodium carbonate solution, washed thoroughly, squeezed and air dried. (See Sample No. 11-1, Table 3). The fabric was then waterproofed by brushing on both sides with the preparation used on Sample No. 29.			{Unexposed	59.1	58.1	— 1.7	0.78	
				{Exposed	39.5	37.1	— 6.1	0.40	33.2
32	Same as No. 31 except hot instead of cold sodium carbonate was used to precipitate the copper on the fabric. (See Sample No. 11-2, Table 3.)			{Unexposed	56.4	58.3	+ 3.4	0.61	
				{Exposed	41.8	40.2	— 3.8	0.35	25.9

per cent loss for an exposed portion of the same commercial khaki duck to which no copper was added (see No. 9, Table 2).

The loss in strength of the samples treated with copper alone (Table 3), resulting from weather exposure, ranged from 40.5 per cent (No. 15-2) to 73.2 per cent (No. 10-3), compared with 46.1 per cent for the exposed untreated control. It is interesting to observe that, in general the samples suffering the greatest deterioration from exposure to weather contained the greatest amounts of copper.

The loss in strength of the copper-containing mineral khaki dyed samples (Table 4), resulting from weather exposure, ranged from 40.8 per cent (No. 19-2, treated with chromium, iron and copper) to 82.9 per cent (No. 18-3, treated with iron and copper). These results agree, in general, with those for the copper-free samples mineral dyed with iron, or mixtures of iron and chromium compounds (Table 2).

Steaming the impregnated fabric for seven minutes before after-treating with sodium carbonate had no effect on its mildew resistance, its loss in copper content during exposure or its loss in tensile strength during exposure. Practically the same results for loss in tensile strength and loss in copper content from exposure to weather were obtained on the samples after-treated with hot sodium carbonate solution as were obtained when cold carbonate solution was used.

The results show conclusively that the presence of as little as 0.11 per cent of copper, based on the moisture-free weight of the treated fabric, was sufficient to inhibit mildew growth. (See Nos. 10-3, 20, 22 and 26-1.) On samples of duck containing less than 0.11 per cent of copper mildew growth developed, causing a perceptible loss in tensile strength. (See Nos. 11-1, 11-2, 21, 23, 25-1, 25-2, 26-1, 26-2 and 27.)

A comparison of the copper content of the unweathered and weathered samples shows conclusively that the samples treated with basic copper carbonate or cupric oxide lost copper through the action of atmospheric agencies.

Many samples which had originally contained copper, particularly in cases where the quantity was relatively small, contained no copper after exposure to the weather for six months.

The results indicate that in treating with copper alone (Table 3), at least 1.70 per cent of copper, based on the moisture-free weight of the treated fabric, must be added in order that sufficient copper will be left in the fabric after six months' weathering under the conditions described to make the fabric mildewproof. In mineral dyeing with chromium, iron and copper (Table 4) somewhat less copper is required, the original quantity needed being approximately 1.40 per cent.

Copper-containing and Copper-free Waterproofed Samples

The results on sample No. 29, presented in Table 5, show that waterproofing the gray canvas by application of petrolatum, beeswax and dry raw sienna[3] imparted practically no mildew resistance. The loss in strength of the unexposed portion after inoculation and incubation was 76.8 per cent, compared to 86.4 per cent for the unexposed untreated control. With the exposed portion, the loss in strength after inoculation and incubation was 52.4 per cent, compared to 43.8 per cent for the exposed untreated control. However, when dry basic copper carbonate, instead of raw sienna, was added to the petrolatum and beeswax waterproofing preparation, the treated fabric (No. 30) was rendered mildew resistant, even after six months' exposure to the weather.

The results on samples Nos. 31 and 32 show that after precipitating basic copper carbonate or cupric oxide on the fabric and then waterproofing with petrolatum, beeswax and raw sienna mixture, mildew did not develop on either the unexposed or exposed portions as a result of inoculation and incubation. By comparing samples 11-1 and 11-2 (Table 3), respectively, with 31 and 32 (Table 5) as regards the loss in copper content from exposure to the weather, it is clearly evident that the waterproofing treatment used on 31 and 32 served as a protection against loss of copper during exposure.

Incidentally, the results in Table 5 for loss in strength from exposure to weather are in conformity with the conclusion from a previous investigation by Jarrell and Holman[2] that the addition of pigments to waterproofing preparations tends to reduce the loss in strength of cotton duck caused by exposure to the weather.

SUMMARY AND CONCLUSIONS

Experiments were made to determine the effectiveness of copper compounds as mildewproofing agents, particularly when used as constituents of mixtures for mineral dyeing cotton duck. Small pieces of unbleached and unsized cotton duck were treated in the laboratory by impregnating with solutions of metal compounds, commonly used in the production of mineral dyed khaki duck, and precipitating insoluble compounds of the metals on the fabric by after-treating with sodium carbonate solution. Iron and chromium compounds were used separately and in various combinations, with and without the addition of copper compound. For comparison, pieces were treated with various low concentrations of copper compound alone and other pieces were treated with a waterproofing mixture (unpigmented, pigmented with raw sienna, and pigmented with basic copper carbonate) and with the waterproofing mixture containing raw sienna after preliminary treatment with copper compound.

Portions of the treated samples and untreated controls were exposed to the weather for six months (April to September, inclusive) in the vicinity of Washington, D.

C., on a frame slightly inclined from horizontal. These were then tested, in comparison with portions which had been kept in a constant temperature and humidity room for the same length of time, for tensile strength (of 1-inch strips) before and after subjecting to a mildew resistance test. In this test strips of fabric, after autoclave sterilization, were incubated for 14 days at 28°-30° C. in petri dishes on agar jelly containing a mineral nutrient and a pure culture of *Chaetomium globosum*. The effect of this artificially induced mildew upon the tensile strength of the various samples of treated and untreated duck was calculated from the strengths of the samples after inoculation and incubation and the strengths of the sterile controls. The effect of exposure to weather upon the tensile strength of the exposed portions of the samples was calculated from the sterile controls from exposed and unexposed portions of the samples. The effect of exposure to weather upon the loss of copper from treated samples was shown by the results of quantitative determinations of copper in exposed and unexposed portions of fabrics that had been treated with copper or mixtures containing copper.

Insoluble compounds formed on cotton duck from solutions containing compounds of chromium alone, iron alone, and combinations of chromium and iron, did not prevent the growth and deteriorative effect of artificially induced mildew. Insoluble copper compounds, precipitated alone or in combination with iron and chromium compounds upon the fabric, did prevent the growth of artificially induced mildew when the quantity of copper present represented 0.11 per cent or more of the weight of the treated fabric.

In all cases considerable, and in some cases complete, loss of copper resulted from six months' exposure to the weather.

Addition of basic copper carbonate to a waterproofing preparation, comprising petrolatum, beeswax, and mineral spirits, inhibited the growth of mildew on the waterproofed fabric, whereas fabric treated with the waterproofing preparation alone or mixed with dry raw sienna was not mildew resistant.

Application of the waterproofing preparation containing raw sienna over copper-treated fabric reduced the proportion of copper lost during weather exposure and did not reduce mildew resistance.

Untreated portions of the fabric and, in most cases, treated samples to which copper had not been added were less readily attacked and were less damaged by the mildew organism, *Chaetomium globosum*, after weather exposure than they were before.

Chromium compounds alone showed some preservative effect on fabric exposed to the weather for six months.

The use of pyrolignite of iron in treating accentuated deterioration during weather exposure, more so than did the use of ferric sulfate solution. Addition of chromium compound to the pyrolignite of iron tended to diminish the deteriorative effect of the latter upon the fabric during weather exposure.

None of the samples treated with iron or mixtures of iron and chromium compounds showed loss in strength after storage in the laboratory for six months.

Copper in excess of 0.2 per cent on the weight of the treated fabric appeared to accentuate deterioration during weather exposure. In general, the loss in strength during exposure increased with the quantity of copper present.

In the case of copper-containing mineral dyed khaki samples, mildew resistance, loss of copper during exposure, and loss in tensile strength during exposure were not affected by steaming prior to after-treating the impregnated fabric with sodium carbonate or by the temperature of the sodium carbonate solution, i.e., hot or cold.

The results indicate that the precipitation of insoluble copper compounds upon cotton duck by means of sodium carbonate, the inclusion of copper compound with other metal compound or compounds in mineral dyeing cotton duck, and the addition of basic copper carbonate to a waterproofing solution, are effective means for mildewproofing cotton duck which is to be exposed to the weather, provided sufficient copper is used to have at least 0.11 per cent of copper in combined form on the fabric at all times. Since basic copper carbonate and other copper compounds precipitated from solutions by means of sodium carbonate are gradually removed from fabrics by atmospheric agencies, a substantial quantity of copper must be used. For duck to remain mildewproof after six months of continuous exposure, at least 1.7 per cent of copper in combined form should be precipitated on the fabric when copper solution alone is used for impregnation. In mineral dyeing with chromium, iron and copper compounds, somewhat less copper is required, the original quantity needed to keep the duck mildewproof for six months being approximately 1.4 per cent.

ACKNOWLEDGMENT

It is desired to gratefully acknowledge the assistance of J. L. Staubly for making some of the routine tests.

References Cited

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[2]Jarrell, T. D., and Holman, H. P. Effects of Treating Materials and Outdoor Exposure upon Water Resistance and Tensile Strength of Cotton Duck. Ind. and Eng. Chem., *15*, p. 607 (1923).

[3]Holman, H. P., and Jarrell, T. D. Waterproofing and Mildewproofing of Cotton Duck. U. S. Department of Agriculture Farmers' Bulletin No. 1157 (revised July, 1931).

[4]Thom, Charles, Humfeld, Harry, and Holman, H. P. Laboratory Tests for Mildew Resistance of Outdoor Cotton Fabrics. American Dyestuff Reporter, *23*, p. 581 (October 22, 1934).

[5]Sutton, Francis. A Systematic Handbook of Volumetric Analysis, Edition 11, p. 206 (1924).

Senseless Things

(Continued from page 504)

In the morning I asked to let me and my helper do some experimenting, to test the result of our findings, and to actually finish some ribbons if possible. I directed the trials to break in my helper in handling the rolls, learn to manipulate the atomizers, and also to ascertain what the right temperature of the finish had to be, and how to maintain it constant in the troughs to produce a satisfactory mist. It was not long before we had as good a finish as they ever had, but we had to familiarize ourselves with the rolling and unrolling of the ribbons, to minimize the natural awkwardness of manual inexperience, before we announced that we were ready to take charge of the finishing room. By the end of the day I persuaded the manager to put my man in charge of the work, under my supervision. Before I left my newly appointed finisher that night I told him that, if he wanted to hold his new position, he had to refrain from bragging about that big bass he hooked on that fishing trip, while we were supposed to be working in a laboratory!

Spraying Hosiery with Glue

The usual thing to do, when problems arise in any part of the mill, should be for the superintendent and the man in charge of the department to get together and work out a solution, unless the superintendent really knows the answer. Mr. X., who was my superior in a hosiery mill, however, thought it was beneath his dignity to take me into his confidence.

As long as hosiery had been knitted with substantial threads hardly any finishing material was necessary to have hosiery well finished. With the diminishing size of the thread sheerer hosiery was obtained which, however, required much thought and attention to finish it properly.

In our mill a small percentage of glue had been the only finish we used on our hosiery, until four thread, full fashioned stockings were considered too heavy for our best number, and a three thread became our finest, most popular style. Then trouble started in finishing them. If the superintendent had confided his troubles to me at once, together we could have found a way out creditable to both of us; or he could have sent for an expert on finishes, of which there were a number anxious to get our trade, and get some worthy advice and finishing material. But this man was one of those conceited individuals, whose job was too big for his ability and was always in fear of showing his ignorance.

He had seen a finishing room, in another mill, where they sprayed a mist of water on their stockings, while they were on the boards, to get a better finish on them. But in that mill they manufactured mostly ingrain dyed hosiery, and that was their way of dampening it for finishing. This man had tried a water spray, using a "Flit atomizer" without results. This hosiery, being so flimsy, required some sizing, different than the glue we used on the heavier hosiery until now with good results. Glue in this case was no longer enough for a good finish.

Mr. X. finally came to me and asked if I had some dissolved glue. I answered that we had the dissolved glue we used to finish the hosiery, and that if he told me what he wanted it for I would prepare it for him, but he said "he wanted a cup of it, just as it was, put into his sprayer." I thought how crazy he was; I thought much more, but I didn't say a word. I told my assistant to give him what he wanted, which he did. He filled up the sprayer for him of a solution containing two pounds of glue for every gallon of water. With that he sprayed a mist on a set of hosiery stretched on the boards.

Not to seem curious, or to be told to mind my business I kept away from the boarding room. I was told later what a time they had peeling off the hosiery from that set of boards! That was the last of his attempts. From that time on the finishing was put on the hosiery in the dyeing machines, each style according to its requirements.

Wanted: A Bath Tub of Champagne

While the mill was passing through an unprecedented period of prosperity the manager, Mr. Y decided to commemorate a birthday by publishing a newspaper, just one number, in which to extol the excellent qualities of a well liked member of the concern, to whom he was indebted for his success and who had made possible the start and growth of the mill. In this number he also wanted to tell the world of the progress made by the mill in the few years of its existence.

He had enlisted the aid of his friends and associates to contribute praises and comments, and with the help of others, who knew how a newspaper should be edited and published, when the birthday came about the newspaper issue was a masterpiece of modern journalism.

The editorial rooms were established in a hotel suite to keep the matter secret until after the event, and it had been decided that when the paper had gone to press all the collaborators would be entertained with an elaborate banquet. On the eve of the banquet Mr. Y called me in his office and said: "You have heard about the stunt —— —— pulled in a New York hotel to amuse his friends? I want to do something like that at the banquet tonight." It had happened recently and the papers were still ringing with the foolish stunt, so I answered: "Yes, the stunt that landed —— in the Atlanta Penitentiary. Do you want to get there too and keep him company?"

"Don't be silly," he said. "A young man, friend of mine, has volunteered to be the bather, dressed in tights. I want you to mix some dyestuffs and some chemicals to put into a bathtub full of water and make it look and sparkle like Champagne." Of all the absurd notions! But he was my employer, and what could I do, but obey orders?

A direct yellow would be just the thing for the color. For the sparkle I thought of granulated citrate of magnesia, but decided to use bicarbonate of soda and tartaric acid (the ingredients which produce the effervescence in Seidlitz powders), but I needed two bottles to put in the dissolved ingredients separately until the time to use them. I asked them of Mr. Y and he handed me two of the well known, triangular shaped bottles in which Scotch is sold. I prepared my colored solutions, poured them into separate bottles and took them to Mr. W at his suite in the hotel, where I told him how to pour them in the bathtub.

If among the readers there are some who attended that banquet they will now learn why the much whispered about bathtub stunt, that was going to be pulled off that night, did not materialize. It seems that, during the festivities, amongst the banqueting horde some one desiring some drink had raided their host's suite, as the most likely place to find what they craved. Mistaking the contents of the bottles, by the color and their shape, had taken them out of the room. When the time came for the bathtub scene the bottles could not be found. Later in the evening some one reported that in the closet of a room in the hotel had been found the fragments of two Scotch bottles and the floor flooded with ginger ale! A good joke on the thirsty ones.

TECHNICAL NOTES FROM FOREIGN SOURCES

Determination of Composition of Cotton-Rayon Yarns by the Iodine Test

Dr. Karin Schulze—Monats. f. Seide u. Kunst-seide 42, 173 (1937).—The distinction described depends upon the fact that cotton, dipped for one minute into a solution of iodine in potassium iodide solution (20 g. in 100 cc. of a cold-saturated KI solution) and then washed in distilled water in the prescribed way (2 bath, 1 minute each, of 400 cc. of distilled water at 20° C., for mercerized cotton 4 baths) loses its color on drying, while rayon retains its deep black color for some hours after drying.

An excellent photograph of specimen tests is reproduced.

Sulfonated Fatty Alcohols in Hot Baths

Dr. V. Pflumm—TIBA 15, 239 (1937).—An article of general nature, giving no practical working details, but a careful discussion of the subject, as related to degreasing, dyeing, soaping, bleaching, and stripping.

TRADE NOTES — NEW PRODUCTS

• PAN-AMERICAN RELEASES

Pan-American Color & Chemical Co., Inc., 48 Bleeker St., Paterson, N. J., announces release of shade cards on the following new products:

Panacet Direct Blue BG—for acetates. Fastness properties claimed for this color are as follows: dry cleaning—very good; perspiration—good; light—good; washing—good. The absorption rate is said to be very rapid.

Panacet Brown DP—for acetates. Fastness properties claimed for this color are as follows: dry cleaning—very good; perspiration—good; light—good; washing—good. The absorption rate is said to be very rapid.

Panacine Brown RN—for rayon. This is a new level dyeing brown, suitable for self shades, combination shades, etc., where good browns are essential.

• WATER-REPELLENT PLAN

It is claimed that for the first time in the history of water-repellent finishes, a thorough and practical test has been made in which local laundries have willingly tied-in with an important department store and agreed to re-proof free of charge the water-repellent goods sold by that store. The store in question is Mandel Brothers, Chicago. The water-repellent

finish is Impregnole—produced by the Warwick Chemical Company—and the laundries are the leading laundries of the Chicago trading area.

The entire promotion, just successfully completed, was based on a variety of washable curtains, including swagger bath curtains, kitchen window ensembles and summer bedroom and living room treatments. All of these curtains were Impregnole Proofed and were heavily newspaper-advertised and window-displayed as being — "Water-resistant, stain-resistant, spot-resistant, and dust-resistant." An additional panel in the ads and on the window cards told, in bold face type, of the "free Impregnole Reproofing Service by Leading Laundries."

• ELECTED DIRECTOR

At the annual meeting of the Board of Directors of the Royce Chemical Company, Carlton Hill, N. J., Mr. E. E. Yake was elected a director of the Company. There has been no change in the Board since the Company was organized almost ten years ago, and the enlargement was made at this time to parallel the Company' growth. Mr. Yake joined the Royce Chemical Company January 1st, 1937, as Assistant to the President.

• GENERAL RELEASES

General Dyestuff Corp., 435 Hudson Street, New York, announces release of the following circulars:

Benzoform Yellow RL—a new direct dyestuff for after treatment with formaldehyde which is said to discharge to an excellent white with neutral and alkaline gums. Circular I.G. 1298

Alizarine Cyanine Green GWA—a new dyestuff of I.G. manufacture offered by General, superior in fastness to washing and milling than old Cyanine Green brands. It is also said to have better affinity from a neutral bath. It is further said to have good affinity for silk and in wool-silk mixed fabrics to give both fibers about the same depth. Circular I.G. 1303.

• ATLAS EXPANDS

Atlas Electric Devices Co., Chicago, manufacturer of the Fade-Ometer, Launder-Ometer and Weather-Ometer has added 12,000 square feet to its plant and installed additional equipment.

The greatly increased demand for accelerated laboratory testing equipment for textiles, dyestuffs, inks, paints, asphalts and other materials, necessitated this enlargement of manufacturing facilities.

Much concerted effort to establish definite standards for manufacture and sale is being put forth by government departments, trade associations, educational institutions, and independent laboratories in cooperation with manufacturers. The result of this combined effort is doing much to establish better relations between maker and consumer by eliminating misapprehensions concerning the durability of all types of merchandise.

Definite product guarantees and instructions for use are now being furnished to consumers by an increasing number of manufacturers. This growing trend has been made possible by the use of laboratory testing apparatus such as the Fade-Ometer, Launder-Ometer and Weather-Ometer. It is stated that these instruments enable manufacturers to know quickly how their products will stand up when exposed to actual sunlight, washing and weathering.

OPEN FORUM

Rules under which this department of the REPORTER is conducted are as follows:

1. Anyone who has a technical problem on which he would like advice may submit it to the Reporter and it will be published in the first available issue.

2. Any reader who feels that he has a solution of the problem may forward his reply to us and if we feel that the reply is suitable it will be published in a succeeding issue.

3. For each such reply published the Reporter will pay a minimum of $2.

4. In case there is more than one answer to the same question, the one covering the subject in the most complete and authentic manner will be published, or if two answers are sufficiently different both will be published. If two answers are considered equally good, the one first received will be given priority.

5. The Reporter will assume no responsibility whatsoever for the accuracy of the answers submitted—it is simply offering a vehicle for the public expression of its readers' opinions.

6. Both the questioner and answerer must send in his complete name and address. When requested we will publish only the initials or other identifying insignia.

Unanswered Question

41—We would like to know the general principles of the process used in rendering silk transparent. Inasmuch as the process is to be used on rather heavy goods, we believe that one of the newer methods whereby thin layers of fiber have been rendered absolutely transparent is necessary. Information along this line which any of your readers are inclined to give will be highly appreciated.—**Library.**

CLASSIFIED

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i.e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

POSITION WANTED: Experienced Dyestuff Salesman Demonstrator desires connection. Now employed. Will go anywhere or would consider taking charge of dyehouse. Solicits inquiries. Write Box No. 967, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

POSITION WANTED: Dyer and Tinweighter with 25 years' practical experience, capable to take charge or supervise all operations of dyeing or weighting of piece goods or skein. Full knowledge in handling silk, Celanese and rayon, also mixed fibers. Can furnish best references from leading concerns. Speaks English, German and Italian. Willing to take position in any part of the world. Write Box No. 968, American Dyestuff Reporter, 440 Fourth Ave., New York, N. Y.

Position Open

OPPORTUNITY for a real live wire salesman with established trade among users of Sulphonated oil, Soaps, Softeners, Sizings, Penetrants, Boil-off oils and other allied products used by the Knit goods trade, including Cotton, Silk, Rayon and Woolen Manufacture.

Application must come from man now actively engaged in above line and capable of earning for himself a substantial salary.

Territory in which we are interested includes the states of North and South Carolina, Georgia, Alabama, Tennessee, and Virginia, in the south, and Pennsylvania, New York, Ohio and Illinois in the north.

State age, experience, present income and technical training, be frank as possible in stating facts. All replies will be kept strictly confidential.

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